The Builder.

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ILLUSTRATIONS.

The Wellington Monument, Hyde Park Corner.—Mr. J. E. Boehm, R.A., Sculptor ..... *Double-Page Typo-Gravure.*
Plans of Roman Thermæ (in illustration of Professor Aitchison's Royal Academy Lectures) ..... *Two Single-Page Photo-Litho's.*
Church of St. Edmund, Southampton.—Mr. W. Lunn, Architect ..... *Single-Page Photo-Litho.*
Jubilee Fountain, Kingston-on-Thames.—Made by Messrs. Doulton & Co, from Designs by Mr. Arthur E. Pearce ..... *Single-Page Photo-Litho.*
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The "Encyclopédie de l'Architecture."

WHEN we say that the two first volumes of the new French Encyclopedia of Architecture* comprise nearly 900 double-column pages, and that the end of Volume II. only gets us as far as the commencement of the article "Béton," it will be at once apparent that this is a work of no ordinary scale and importance. As far as it has at present gone its aim appears to be to treat of all important subjects connected with design and construction in architecture, to give a historical review of the architecture of the principal nations of the world, special descriptions and illustrations of important buildings, and short biographical notices of the life and work of the most eminent architects of various periods. These biographical articles are, however, kept very short, more after the manner of the short notices in the English "Dictionary of Architecture." In other respects the aim seems to be to treat the principal subjects with something like the degree of fulness and elaboration shown in Viollet-le-Duc's great work; and as that was confined to Mediæval architecture, it is obvious that an attempt to carry out anything like the same scale of critical and explanatory treatment for the architecture of the whole world and of all times, besides including all the various forms of construction considered on their scientific side, represents a task of which it is difficult to foresee the end or limit. In one respect it is at once evident that the comparison with Viollet-le-Duc's work cannot be sustained,—namely, in the illustrations. These are very numerous and very useful, and occasionally quite adequate in style and execution to the importance of the occasion; and, of course, in the case of the smaller cuts, even of architectural work properly so called, a simple line elevation is sufficient for the purpose; but many of the perspective sketches of buildings, line-drawings reproduced by zincograph or some analogous process, are in a hard, scratchy manner, without tone or effect, and would not be accepted in the present day by any English architect as adequate representations to accompany an important architectural work. We regret to find that among the very worst of these are many of the illustrations of English buildings.

As every one would expect in an encyclopædia conducted by M. Planat, practical subjects receive very full consideration. The article "Acier," for instance, deals at considerable length with the composition and properties of steel, and gives sectional illustrations of the Bessemer and Siemens converting furnaces, and descriptions of their method of action. "Acoustique," which follows, is also very carefully prepared, and gives a number of illustrations of various machines which have been used to analyse and obtain diagrams or other visible illustrations of the action and mechanism of sound. The special application of the subject to the acoustics of buildings is reserved for a future article on "Salles d'audition." The article "Assemblage," which is used in French for the joining of the parts in carpentry and iron construction, treats at considerable length of this problem, with a sufficiency of small diagrams of joints and fishings in woodwork and connections in ironwork. The article on "Adjudication," and one or two others on questions which enter into the province generally distinguished in England as "professional practice," are, of course, more especially interesting to French readers, as such subjects are naturally treated in accordance with French practice.

The article "Architecture" comes within the first volume, and we are naturally curious to see how this central subject of the whole is treated in an architectural dictionary. The subject runs through nearly 250 pages, under the sub-headings "Civile et Domestique," "Funéraire," "Militaire," "Privée," and "Religieuse," in the order here named,—which strikes one as oddly assorted at first, but which is evidently arranged on alphabetical consideration only; "Religieuse" occupying by far the larger proportion of space. The philosophical consideration of the art of architecture itself, its principles, its objects, its capabilities and limits, ought, one would have thought, to be considered as a separate subject before coming to subsections. This view of the subject is not entirely overlooked, but it is only glanced at in a few prefatory remarks at the commencement of the "Civile et Domestique" section, and dismissed with the remark that civil and domestic architecture only belongs to peoples in an advanced state of civilisation, and therefore has passed beyond the subject of primary origin. A general consideration of the origin of religious architecture is prefixed to the chapter on that subject, but only deals in general reflections with no very decisive conclusions, and the article (which is signed by M. Planat) then becomes historic. We should certainly have considered that in a dictionary of this kind there should have been an article, as concentrated as might be, for the reader who might (not unreasonably) look to the work for an answer to the question, "What is architecture?" Otherwise, the treatment of the different sections of the subject is very well carried out, except that "Architecture Privée," certainly a very important branch of the subject, is dismissed in a short article of three pages by M. Paul Sédille, with no illustrations at all. It may be replied that the subject can be treated in detail under "Maison," as one section of it is treated in the present volumes under "Appartement"; but then the same thing might be said of "Église," under which heading much of what is contained under "Architecture Religieuse" might have come. There is a sense of disproportion in seeing one subject treated at great length in a dictionary, and another dismissed briefly; it looks as if there were not a strong enough hand over the contributors, and as if each were doing what was right in his own eyes; and it is impossible to make a perfectly homogeneous and logical dictionary on that footing. There are other evidences of the same want of central control or sense of proportion. "Architecture Autrichienne" occupies ninety-seven pages; "Architecture Anglaise" only twenty-three,—an absurd disproportion. The article on "Architecture Religieuse" gives a remarkable *résumé* of the history of the subject, with plans and sketches of the typical temples and churches of every era, from the earliest known Egyptian examples, and includes a sketch of the recent information that has been brought to bear on Persian religious architecture by the researches of M. and Madame Dieulafoy. Greek temple architecture is ably treated of in regard to the literary portion of the article, but is very inadequately illustrated; the restored view of the Parthenon is such a poor affair that it would have been more to the credit of the book to omit it. Roman temple architecture receives much better treatment in this respect; it is, of course, much easier to illustrate, not requiring the refinement in drawing which Greek architecture demands. As a general rule, how-

* "Encyclopédie de l'Architecture et de la Construction." Directeur, P. Planat. Paris: Dujardin et Cie.

ever, the illustrations of this, as of some other articles, go to show that it is better in an architectural work of this kind, where illustrations must be numerous and mostly small, to avoid views as much as possible, and to confine the illustrations to geometrical drawings, which do not require the same finish of execution as a perspective view must have if it is to be worth having. A section and an elevation profess to give us the actual facts of the building; a perspective view professes to give its impression and effect as it appeared, and we want something more than mere correctness in this,—something of artistic effect, unless (which in some respects would, perhaps, be preferable for this kind of work) the view were confined to a carefully-drawn outline. In general, an encyclopædia of this kind is chiefly used by students of architecture who understand and chiefly require sections, plans, and elevations; such readers do not want pretty pictures, and at the same time they are of all others the most likely to be annoyed by bad ones. Among the perspective illustrations of later (Mediæval) buildings are some better drawings, as the views of Lincoln, Cologne, and Burgos, though they are all rather hard and wiry in style,—to English eyes, at all events. St. Paul's, we observe, is not honoured with any illustration in this chapter, though St. Geneviève and St. Sulpice, and others of the Renaissance churches of Paris, are duly promenaded.

The article on "Architecture Anglaise" is very badly done, and full of absurdities. The editor appears to have put it into the hands of an architect nominally English, but with an entirely French education and French ideas, apparently on the ground that he could write about English architecture in the French language. M. Planat would have done far better for his book if he had got the article written by an Englishman thoroughly conversant with the subject, and then had it translated. The most provoking part of it is that the writer persists in identifying himself with England, speaking of "nous" always, and referring to "mes compatriotes," leading foreign readers to suppose that he is expressing English opinions and conclusions. He has discovered that Wren was incapable of designing anything himself, and that all the good things in his works were done by French architects in his employ. He admits he has no documentary evidence of this, but Wren "nous a laissé une foule des documents en pierre que tout architecte qui sait son métier peut facilement interpreter." How far the author of the article is up to date in his study of Gothic architecture may be inferred from the fact that the details of English Gothic, the development of window tracery, and other things, are illustrated only by copies of the old diagrams in Gwilt, which are all produced here as adequate illustrations of English Gothic; drawings which were made at the time when Gothic was just beginning to be studied in modern England. Gothic ornament is illustrated by a cap from Westminster Abbey and a Perpendicular base and capital from Howden, the hard cast-iron drawing of which has been familiar in all the editions of Gwilt for half a century. The article seems, indeed, to have been mainly got up from Gwilt's venerable historical sketch. Moreton Old Hall and a good many other cuts are copied or photographed from it. Wollaton Hall is illustrated by what is apparently a clumsy outline tracing from a poor engraving in Gwilt, turned in the reverse direction to the original. The writer has got hold of a theory that the square end of the English chancel resulted from the difficulty the English builders experienced in constructing stone vaults, which led them to employ open-timber roofs which could not be so conveniently fitted on to a *chevet* termination; and gives as an instance Westminster Hall! It does not seem to have occurred to him to consider what was the date of Westminster Hall roof; or how much vaulting had been built in England before that; or that Westminster Hall was a very different thing from a three-aisled church; or that when one portion of an English church is vaulted and another portion not, it is always the nave that has the timber roof, and the choir the vault. The writer's capabilities for treating of English Gothic architecture may be further estimated from others of his illustrations. The only Mediæval church of which a decent illustration is given is the west end of the interesting but not very important church of Edington. A Mediæval tower is illustrated by a vilely-drawn elevation of All Saints, Derby, which has the appearance of having been enlarged from the small (and very bad) engraving in Gwilt by a French draughtsman who knew nothing of Gothic, and so filled in the detail at his own sweet will. Modern English Gothic is illustrated by St. Mary's Cathedral, Edinburgh, notoriously one of the least successful of Scott's works. None of Street's churches are referred to, though his name is mentioned; and of Mr. Butterfield and the fame of his churches the writer apparently knows nothing. The name of Mr. Waterhouse, who has certainly played as large a part in modern English architecture as most people, is not mentioned; and a scratchy drawing of the upper part of a "Maison d'une Compagnie des Assurances" appears to be an attempt to make a drawing of part of Mr. Norman Shaw's building at the bottom of St. James's-street, conveying no idea whatever of its real effect. We learn that "en France architecture grecque, entre les mains de Labrouste, Duc, et Duban, à été feconde en effets heureux, mais en Angleterre, entre les mains des amateurs ignorants, elle enfanta le gâchis"; a statement little short of impudent. The most important and remarkable building of the Greek revival, St. George's Hall, of which the writer does not seem to have heard, was the work of an English architect, Elmes, of whom also the writer has not heard. St. George's Hall is not illustrated, but St. Pancras Church is, to show the absurdity of English Classical work. We may as well inform French readers that few buildings have been more ridiculed in England than this one. One or two of the buildings erected by Cockerell (who is called "Cokerell") for the Branch Banks of England might also have shown French readers that refinement and originality in the application of Classic types to modern purposes were qualities not quite without illustration on this side of the Channel. We can hardly expect this, however, when we find that St. Paul's is considered sufficiently illustrated (?) by a wretched little line diagram, without the slightest attempt at effect, and looking as if it was drawn with a kitchen fork. English readers will hardly recognise "Dean Collett" or "Sir Thomas Morus" as personages in English history, any more than they will accept the poverty-stricken design of a "Maison dans Sundrige Parck" (*sic*) as a typical example of modern English villa architecture of the "Queen Anne" type.* The best thing M. Planat can do is to cut this article out of his next edition, and get an article on English architecture written by a competent English architect, who knows something about the subject, and knows where to go for adequate illustrations of it.

The article on German architecture, "Allemande," not by any means full enough if we are to consider it in comparison with that on Austrian architecture, is, at all events, much better illustrated than that on English architecture. The illustrations are exceedingly interesting in one sense, that they represent a number of curious, picturesque, out-of-the-way examples of the whims that Renaissance architecture took on German soil, and to illustrate these appears to be the main object of the article. It has given us a number of interesting illustrations; but that is not the way to treat such a subject in an Encyclopædia. What is wanted is a logical and connected study of the development of the architecture of the country, not a collection of interesting examples put in without selection or order. The article is much more connected and logical than the illustrations; it commences with remarks on the Romanesque and Gothic of Germany, and the main facts of their development, but not an illustration is given of this portion of the subject. Now the Romanesque of Germany forms one of the most interesting chapters of architectural history, and includes buildings of a very grand and noble though simple style, far better worth illustrating, and occupying a much more important place in architectural history, than the *rococo* eccentricities of German Renaissance. The conclusion suggested by the article is that it is written by some one who has a taste for German *rococo*, and who happens to have a good many illustrations of that type of work on hand, and the course of the article is governed by the materials available, and by the special tastes of the writer. Now, that is exactly what it is desirable to avoid in a book of this class. An encyclopædia is not the place for the setting forth of doctrinaire theories, or of personal likings and dislikings; the object should be to give on each subject an unbiassed *résumé* of what is known on the subject in a condensed and concentrated manner, and with special attention to logical and well-balanced arrangement; and to attain this end it is absolutely necessary that the editor of such a work should have his eye over the whole, and control the individual tendencies of contributors. This has evidently not been sufficiently the case in the "Encyclopédie de l'Architecture" so far, and the consequence is that some articles, or some portions of articles, run to undue length in accordance with the inclinations or special knowledge of the writers, while others, equally important, are passed over in a cursory manner.

Subjects such as "abside" and "abbaye" appear to be well treated; and if the history and architecture of French châteaux is intended to be treated and illustrated to the same extent as those of "Azay le Rideau" and "Amboise" in the present volumes, the complete dictionary will be a valuable book of reference in regard to French châteaux; but this, again, is unduly emphasizing a special subject. And it may fairly be questioned whether such long articles as those on "Architecture Religieuse" and "Architecture Autrichienne" (for example) are not going beyond the limits of what is necessary and convenient in an encyclopædia. No one who is seriously studying the history of temple and church architecture would content himself with an encyclopædia article, or even think it worth while to look at one; the object of an encyclopædia is to give a *résumé* or outline of the subject for immediate reference; a small treatise on the subject is more than is wanted for reference, and less than would content a student. And every unnecessarily lengthy article adds to the difficulty of bringing the work to completion. The world is strewn, so to speak, with the wrecks of dictionaries and encyclopædias which have remained incomplete in consequence of having been started on too extended and ambitious a scale. We wish that the "Encyclopédie de l'Architecture" should not add another to the number.

* We seem to remember this as a design once offered to us for publication, and declined. It is a mere piece of estate agents' architecture, and to publish it as an example of modern English house architecture is a libel on the English profession.

THE REVISED RAILWAY RATES.

THE new classifications and schedules of rates required by the Railway and Canal Traffic Act have now been deposited with the Board of Trade. The lack of uniformity, upon which we briefly commented a fortnight ago (see p. 120, *ante*), renders the study of them a somewhat formidable matter, especially as the proposed charges include a double set of "terminals" at each end, in addition to the maximum per mile for conveyance. There are certainly not such a number of different rates introduced as there would have been had the existing authorised charges for all the separate sections been maintained, the companies having in many instances agreed

upon a scale applicable to all,—or nearly all,—the different portions of their system.

With regard to the classification, ordinary merchandise is still divided into five classes, and heavy traffic into three,—the latter to be henceforward denominated A, B, and C. Each of these latter classes is subject to "station" terminals, but only Class C,—which corresponds to the present "special class,"—to "service" terminals in addition. Appended to the classification are a number of general conditions, upon which (as well as upon the classification proper) the companies are practically in accord. Some of these conditions first appeared in the abandoned Bills introduced by the railway companies in 1885. Among these we may quote at length a few important clauses:—

"*Special Charges.*—The company may charge such reasonable amounts as, in case of difference, shall be determined by the Railway Commissioners in respect of the following matters:—

A.—Accommodation provided by the company at or in connexion with sidings not belonging to the company, and the delivery or reception of traffic to or from such sidings.

B.—The collection or delivery of merchandise.

C.—The use of trucks, or the use or occupation of any accommodation included in the station terminal, beyond such period before or after conveyance as shall be reasonably necessary for enabling the company to deal with merchandise as carriers thereof, and the services rendered in connexion with such use or occupation."

It will thus be seen that there may be a variety of extras to be considered beyond the charges covered by the authorised maximum rates. Another regulation which comes from the 1885 Bills is the following:—

"For a fraction of a ton in respect of consignments exceeding 560 lbs. in weight, the company may charge according to the number of quarters of a ton in that fraction, and a fraction of a quarter of a ton shall be deemed a quarter of a ton." This rule, having no qualification or exception, cannot surely be justifiable. The effect would seem to be that anything weighing just over 5 cwt. is liable to be treated as weighing half a ton, and this, (especially in the case of an article placed in one of the higher classes) would increase the charge to an unreasonable extent. This proposal is one which should be objected to.

With regard to "smalls," too, the powers of the companies should be more clearly defined. This is a matter upon which they could easily be in agreement, but the proposals vary considerably. Many of them adopt the following very elastic and convenient rule:—"For small parcels not exceeding 560 lbs. in weight the charge shall be such reasonable sum as the company may think fit." This leaves room for endless variation, although a scale, similar to that at present in force, will probably be eventually adopted by all. It will be noticed that the limit of weight for smalls is raised from 500 lbs. to 560 lbs. There is this fact to be considered all through,—that the companies, feeling themselves bound to provide against possible contingencies, ask for wider powers than they really desire to exercise under the prevailing state of affairs; and, practically, this rule of "what the company may think fit," modified by the maximum rates and the oft-quoted rule of "what the traffic will bear," will always control rates to a very great extent.

A comparison of the new classifications with those of 1885 reveals the fact that several articles are now placed in higher classes. "Empties,"—which railway people regard with aversion,—are actually placed in the fifth class. In 1885 they were in class four, while, practically, they are not dealt with as being classified at all,—except in the case of new empties,—being subject to special regulations. This is a remarkable contrast to the old rule of "free returns," though, under the present scale (which has advanced step by step), empties are still looked upon as unprofitable and undesirable traffic. Of course, the existing regulations may still be retained in practice; but if allowed to remain in the highest class, there will be plenty of margin in reserve for the upward tendency to be continued. Light castings in boxes, &c., are advanced a class, so is twine and hemp, and several other articles are "moved up" in the same objectionable manner. Copies of the classifications may be obtained from any station-master for a shilling, and traders will be able to see for themselves how the particular merchandise in which they are interested is classified; but, the rates per mile varying, a few specimen rates are appended.

NAME OF RAILWAY COMPANY.	Class.	Proposed Maximum Rates for Conveyance (at per ton per mile). For the first 10 miles or any part of such distance	For the next 20 miles or any part of such distance	For the next 20 miles or any part of such distance	For the remainder of the distance	Proposed Station Terminal at each end. At large towns as defined.	At any other station.	Proposed Service Terminal at each end. At large towns as defined.	At any other station.
		d.	d.	d.	d.	per ton. s. d.	per ton. s. d.	per ton. s. d.	per ton. s. d.
London and North Western	A	1	1	¾	¾	0 8	0 6	—	—
	B	2	1½	1¼	1	1 0	0 9	—	—
In the case of this Company, the first column is for "the first 20 miles," and there are exceptions to the scale for Class A.	C	2½	2	1⅝	1¼	1 3	1 0	0 9	0 6
	1	3	2½	2	1⅝	2 0	1 6	1 6	1 0
	2	3½	2¾	2½	2	2 0	1 6	1 9	1 3
	3	3½	3¼	3	2½	2 0	1 6	2 0	1 6
	4	4	3¾	3½	3	2 0	1 6	2 9	2 0
	5	5	4½	4	3½	2 0	1 6	3 6	2 6
Great Western	A	1¾	1¼	¾	½	0 8	0 6	—	—
	B	2	1½	1	¾	0 8	0 6	—	—
	C	2½	2	1½	1	1 3	1 0	0 9	0 6
	1	3	2½	2	1½	2 0	1 6	1 6	1 0
	2	3½	3	2½	2	2 0	1 6	1 9	1 3
	3	4	3½	3	2½	2 0	1 6	2 0	1 6
	4	4½	4	3½	3	2 0	1 6	2 9	2 0
	5	5	4½	4	3½	2 0	1 6	3 6	2 6
London Brighton and South Coast	A	2	1½	—	1	0 8	0 6	—	—
	B	2	1½	—	1½	0 8	0 6	—	—
	C	2½	2	—	1½	1 3	1 0	0 9	0 6
	1	3	2½	—	2¼	2 0	1 6	1 6	1 0
	2	3½	3	—	2¾	2 0	1 6	1 9	1 3
	3	4	3½	—	3¼	2 0	1 6	2 0	1 6
	4	4½	4¼	—	4	2 0	1 6	2 9	2 0
	5	5	5	—	4¾	2 0	1 6	3 6	2 6

The effect of the addition of "station" and "service" terminals to the rates for conveyance will be readily understood by a reference to the subjoined table. We may first give the definitions of the two charges as they appear in the "general conditions" agreed to by all the companies; together with a list of the "large towns" mentioned by the principal English companies.

"Maximum station terminals include the charge for accommodation (exclusive of coal drops) at terminal stations provided by the company for dealing with merchandise as carriers thereof, before or after conveyance, together with the following services and expenses, viz., share of general charges and office expenses attributable to such services as are rendered by the company to all descriptions of merchandise alike, in performing the duties incidental to the duties of a carrier, shunting and marshalling of trucks, and the provision of engines, horses, machinery, plant, and stores used in the services referred to in this sub-section.

Maximum service terminals include the charges for the following services rendered by the company in dealing with merchandise as carriers thereof, before or after conveyance, viz., the labour of servants of the company in loading and unloading, covering and uncovering merchandise, the provision of machinery, plant, sheets, and stores used in such services, and also the share of general charges and office expenses especially attributable to the classes of merchandise in respect of which service terminals are authorised."

The large towns are London, Liverpool (including Bootle), Manchester (including Salford), and Birmingham; while the Manchester, Sheffield, and Lincolnshire add Ashton-under-Lyne, Oldham, Barnsley, Sheffield, Rotherham, Hull, and Grimsby. It is provided that other places may from time to time be added by the authority of Parliament.

Above we give a typical list of the proposed maximum charges. It will be noticed that the suggestion thrown out by the Board of Trade as to separate rates for truck and train loads has not been adopted, but the companies will doubtless make special agreements for exceptional quantities of traffic, as heretofore. They would, however, have been less liable to incur charges of undue preference, by submitting a lower scale for such exceptional consignments.

NOTES.

THE suggestion made by Mr. Somers Clarke at the Society of Antiquaries' meeting, on Thursday evening, February 21st, in regard to the proposed addition to Westminster Abbey, is certainly worth consideration. Mr. Clarke argues that the position to the south-east of the Abbey is the best one, provided that the new building were a much smaller one than that already suggested, placed east and west, and kept clear of the Little Cloister and the other remains of Mediæval work. The great objection to the addition as proposed is its preposterous size and the utterly unarchitectural manner in which it is proposed (so far) to join it on to the ancient buildings. We see no decided objection to the addition of a smaller-sized chapel in the place proposed by Mr. Clarke, provided it can be connected with the Abbey in such a manner as not to injure the architectural effect of the latter, and (which is still more important) provided it is carried out in a manner worthy of the position architecturally; and we may warn those who wish to support the project that it will cost more to do that than most of them have probably estimated. Mr. Shaw-Lefevre asserted at the meeting that he had been assisted in his scheme by Mr. Pearson. Are we to understand that Mr. Pearson is responsible for the planning of the connexion of the new building with the Abbey, as shown on the plan published in the *Nineteenth Century*? If not, it would be to the credit of English architecture that he should deny having had any hand in such a piece of bungling.*

* We take the opportunity of commenting a slip of the pen in the leading article of last week (page 138, second column,—"a narrow aisle winding under the flying buttresses of the nave"; it should, of course, have been "of the Chapter-house."

THE site of the Sanctuary of Aphrodite Pandemos at Athens has long been a matter of dispute. An inscription, the discovery of which is reported in the last number of the Athenian Δελτίον, though it does not settle the question, affords important evidence. The inscription records certain measures relating to the ritual and general expenditure of a sanctuary which is twice distinctly named as that of Aphrodite Pandemos. It was brought to light in pulling down the Turkish wall which intervened between the temple of Niké Apteros and the south tower of Beule's gate. Of course, an inscription can be dragged about anywhere; but as there are other substantial reasons for supposing that the sanctuary was close to the Propylæa, the discovery of the inscription certainly tells in that direction. Dr. Köhler and others have tried hard to place the sanctuary close to the Asklepieion; but the fact that the heroon of Ægeus *must* have been just under the Niké Apteros, where tradition says he threw himself down and died, is a strong presumption that the Aphrodite worship, so closely linked with the whole Troezenian tradition, was close at hand. The fixing of the site is of great importance, as with it goes, according to Pausanias, the shrine of Ge Kourotrophos and Demeter Chloe. Before the whole wall in question is pulled down we may hope for a good deal more of this sort of topographical evidence. The inscription is on a slab of Hymettian marble, adorned with a decorative pediment, and, according to Dr. Lölling, dates (by the archonship of Euthicos) at 283 B.C.

IN *L'Architecture* for February 23, M. Loviot replies to the anti-polychromatic views of M. Pottier, alluded to in our last (p. 141, *ante*). M. Loviot asserts that when he was measuring the Temple of Jupiter Panhellenius at Ægina he saw large fragments of stucco coloured red on the floor of the cella, some of them still adhering to the pavement. From the cella floor to the steps of the temple, he argues, is not far; why should there not have been coloured stucco on the steps? He confesses that, supported by this evidence, he would, in any restoration of the Parthenon, paint not only the columns but the steps. "If," he says, "there is not historic argument in favour of the polychromy I have adopted, there is none against it." This seems an exceedingly dangerous line of reasoning; and the continuation of M. Loviot's remarks is in the same style of logic: Polychromatic decoration is beautiful, therefore it must have been employed everywhere by the Greeks, who, besides, were under the necessity of employing it everywhere to hide the excessive whiteness of Pentelic marble, which was injurious to the eyes. It has often been argued that since the Pentelic was given the preference, it was on account of its whiteness. M. Loviot goes on to say that while the archæologist is occupied in accurately reading the sense of inscriptions to get at their meaning, the architect is guided "par le sentiment personnel," and by probabilities. "S'il arrive que le sentiment et les probabilités s'accordent, tout est pour le mieux, car, avec un compas et un pinceau, il faut de la décision. On ne dessine pas des doutes, on ne colore pas des hypothèses. J'ai pris le parti de faire ce que je crois être le plus beau, le plus conforme au génie grec." That is admirable, no doubt, but it is not archæology.

THE same number of *L'Architecture* from which the last citation is made includes several records in detail of French cases of party-wall disputes, and the judgments on them, which may be of interest to those who are specially concerned with questions of building-law.

AT the instance of the Belgian Minister of Public Works, M. D'Hauw, a chemist attached to the University at Ghent has been experimenting upon the combustibility of ordinary as well as chemically-prepared wood, the results of which are stated as follows:—When raw wood in its natural state has for half-an-hour been heated under a temperature of 300 deg. C., it becomes completely free from all moisture, assumes an amber colour, whilst its bearing-strength is greatly decreased. At a temperature of 300 deg. C. the wood assumes the character of charcoal, and the bearing-strength is nearly nil. However, the structural features of the wood are in either case but little affected. But when the temperature is increased to red-hot point the wood was rapidly consumed, flames breaking out on all sides, and the fire continued until ashes alone remain. Wood, on the other hand, coated with some fire-proof material, as, for instance, asbestos, undergoes no structural change under a temperature of 200 deg. C., although the colour becomes brown and the bearing-strength lessened. If wood be steeped in certain chemicals,—as, for instance, phosphate of ammonia, which is much used for impregnation,—the results under the same circumstances are different, the wood assuming a deep brown colour, whilst the bearing-strength is still more reduced. If heated to a still higher temperature, chemically-prepared wood will be consumed like the natural wood, but much more slowly. We give this information (from a German paper) as being of some interest, but of course cannot be responsible for the correctness of the conclusions arrived at.

AT the Goupil Gallery there is at present a small but interesting collection of the works of Corot, including some paintings in his finest style. Among these, perhaps the best is the "Danse des Nymphes" (3), a large landscape, framed in by masses of trees on either hand, as Corot liked to do, with four figures dancing on a green knoll a little way from the foreground, relieved against an evening sky; a soft, hazy distance of undulating country is beautifully indicated behind the ridge. Perhaps a still more complete work, of the same stamp, is the smaller one, "Joueur de Flute" (1), also an evening landscape seen through trees, with a figure, very unobtrusively introduced, seated and playing the flute; just sufficiently seen to give a human element to the scene. This picture is an example of the pure imaginative poetry of landscape painting; not a mere representation of nature, but a scene expressing a mood or sentiment of the mind. The "Lac de Garde" (2) is equally so, but an entire contrast to the last-named; a silvery spring scene by the side of a lake, the water of which is "invisible with calmness," and only indicated by the reflection of the landscape upon it. It is interesting to learn from the preface to the catalogue that when Corot came to his studio in the morning he examined the unfinished pictures till he came to one that harmonised with his feelings that day. "If he felt gay and happy, he would choose a scene in spring, and he would revel with his brush in a field of flowers, a smiling river, with the willows and reeds moving in the breeze. At other times he inclined to the severely-classical landscape, grave and grand, full of sobriety and dignity." This is quite borne out by his pictures. They each represent a phase of feeling expressed through landscape, and are always either distinctly light and gay or distinctly pensive. Among the smaller works of the bright mood, an exquisite one is "La Vanne" (16),—a meadow, with trees in the middle distance, and a sluice-head built up in masonry in the foreground, the solidity of which, and its dark shadow on the grass, are of immense value in giving aërial lightness to the rest of the scene. "L'Arbre Brisé" (10) is unusual in its composition for Corot; a common, a pond, and a cottage, with a dark mass of trees on the left; but the materials of the scene, though prosaic in themselves, are floated off into a semi-ideal haziness, very different from the realistic representation of a common and a cottage. The collection contains what is certainly seldom seen, a nude figure by Corot, seated in front of a group of trees, in the picture entitled "La Toilette" (15). The figure is not very beautiful, but the girl leaning against a tree in the background with a book is a charming bit in the composition of the whole. One or two other figure-pictures, especially "Le Passeur" (17), a man fording a brook, are of interest as showing Corot in a light in which he is not often seen. They are probably early works.

A COLLECTION of small water-colour drawings by Mr. C. E. Hern, under the title "London Churches," is on view at Messrs. Dowdeswells' Gallery in New Bond-street. Many of these show much artistic feeling for colour and effect. Putney church (which is hardly a London church) is shown in a misty morning effect, with part of the old bridge, now removed. The prim architecture of "St. Mary's, Paddington," and "Holy Trinity, Clapham," comes out with much effect in a snow scene; in both of these the atmospheric effect is exceedingly good. "St. Clement Danes, Strand," is well treated in a rainy day view, and "St. John's, Paddington" groups well in an autumn scene with a warm late-evening sky behind it. Some of the drawing of the architecture is, however, open to much criticism in regard to perspective. We have often remarked on the inability of many artists who treat architectural subjects to draw circular buildings in perspective correctly,—inability or carelessness. The artist here is in the same condemnation. In his view of St. Paul's, a larger drawing than the others, the horizontal lines of the dome are all crippled, the lantern is not set properly on the top, and looks as it would when seen in elevation. "All Souls, St. Marylebone," where there is a good deal of circular work, is as bad, or worse, in this respect. The fault, in many such cases, is the same as it is here; the artist forgets that the receding circle in perspective,—supposing the case of a horizontal curve such as a string-course seen from below,—is perpetually increasing its ratio of apparent curve as it recedes from the centre to the side, the ratio being greatest near the point where it disappears from view; and that in the portion nearest the centre of a circular building the apparent curve is flattest. Artists are always giving too much curve near the centre, and then running out in a straight line to the sides. We have seen this over and over again in exhibitions; indeed, we believe many painters who can foreshorten an arm cannot put a building into perspective; not that the latter is not much the easier task of the two, but they neglect to study it. In the drawing of "St. Mary-le-Strand," in the collection here mentioned, the tower is not centrally over the front; and in the little cupola of "St. James, Westminster," each stage is wrong in regard to the one below it, the whole thing being out of drawing completely. The drawings have artistic merits of another kind, but that is not the way to draw architecture.

THE publishers of *L'Art* send us two large etchings by M. Daniel Mordant, one from the picture entitled "Mise à Flot," by M. Ulysse Butin, a seaside scene where a heavy boat is being pushed off into the sea; the action of the figures is fine and energetic enough, but the surf rather woolly-looking, in the etching at least; we do not remember the picture. The other is from an exceedingly clever picture by Mr. J. Lavery, "Lawn-Tennis," which, if we remember aright, was in the Royal Academy a year or two ago. The peculiar bright effect of sunlight given in the painting it is difficult to convey in such a medium as etching; it can hardly be said to be conveyed in this case; but the figures, treated in a free, sketchy style, are admirably rendered in the etching, which provides lovers of lawn-tennis with a pictorial representation of the game, at once artistic in spirit and true in character and action.

THE exhibition of water-colours by artists of the Dutch school, now open at the Fine Art Society's rooms, includes a good deal of work that is powerful in its way, though in many cases distinguished by an apparently ostentatious disregard of detail or realism. For example, De Jong's "Horses Drinking" (15) produces at first glance the impression of representing horses that have

fallen down on ice; there is certainly no indication that what conceals part of the animals is water. The architectural interiors by Bosboom (63 and 75) are mere scrawls, in which a smear with a brush passes for the modelling of a moulding, and a few dabs for a carved capital. This sort of thing passes muster with some foolish people, we presume, as a novelty, but it is mere botching, not art. Among the good things of the collection (there are many, if we regard them in the light of sketches and studies) "Dutch Meadows, near Gouda" (7), by Herr Roeloss, a typical Dutch subject, made only out of level grass, cows, and a wooden railing; the "Sewing Lesson" (11), by Herr Neuhuys, an interior with two figures effectively lighted; a "Dutch Village" (19), by Herr Bastert, an admirable little work; "The Waterfall" (57), by Herr Mesdag, a regular hurry and rush of water; "The North Sea" (67), by the same artist, cold enough in colour to be the North Pole, but fine in the movement of the sea and wildness of the sky; "The Heath near Eede" (103), by Mdme. Mesdag van Houten, a fine piece of "blottesque"; and two figure subjects by Herr Artz, "Day Dreams" and a "Sunny Day" (100 and 111), of which the latter is beautiful; it represents two or three peasant girls, treated in a kind of abstract decorative manner, on sand-hills near the sea, against which the standing figure is relieved; this is a really artistic work in the best sense.

THE set of sketches in oil (for they are no more) by Mr. A. Ludovici, called "London Life," exhibited at Messrs. Dowdeswells' Gallery, represents most prominently the quality which the French call *chic*. They are clever, smart, and vulgar; the latter especially. The faces of the figures are mostly merely dabs of colour, the lawns and streets smears of paint; but the action and character of a certain sort of Londoners is often well hit off. One of the best is "A Fare" (5), a girl getting into a hansom; another good one is the young woman leaning over the rails of a pond, with the title "Skates" (21), one of the few well-painted heads in the collection. There are other clever sketches among them, but they do not represent "London life," except of a very third-rate sort.

LETTER FROM PARIS.

IT is now about three months since the competition for the design for the diploma of the Exhibition was held at the Hôtel de Ville. At this first competition, of which the *Builder* made some mention the jury, out of 150 competitors, chose the designs of MM. Michael Lançon, Louis Bonnier, Henri Danger, Daniel Dupuis, and Victor Galland. The second competition has just been decided, and the sketch of M. Galland has been chosen. The subject of this composition represents the chariot of Progress, drawn by lions, and guided by different figures personating the several nations.

As regards the Exhibition itself, the preparations continue in all directions, being very much assisted by the fine weather. In the Palais des Beaux Arts, M. Formigé has made up for a great deal of lost time. At night the work is carried on by electric light, and the interior decoration of the dome, as well as the galleries, is getting on rapidly. It is the same in the Palais des Arts Libéraux, where the interior installation is carried on without interruption. In the Palais des Exposition Diverses, the interior of the principal dome (of which the height is about that of the Panthéon) is still filled up with scaffolding. On the other hand, all is finished in the gallery reserved for the manufactures of the State, of which the arches are ornamented by colossal heads of the Republic, relieved against a red background with palms and garlands. In the galleries of the different industries legions of workmen are at present occupied in arranging the cases. The designation of the classes and of the objects is finished, and these galleries could easily be opened to the public at the beginning of April.

In the foreign sections, generally less advanced, we are glad to see that that of England is likely to be completed first.

In the Belgian Court, the installations are only indicated by boarded partitions. In Austria-Hungary the walls are not finished. In the Russian, Italian, Portuguese, and Spanish sections, there is no trace of decoration or installations. The Swiss section is in progress, and in that of the United States of America the interior painting is almost completed.

In the Galerie des Machines all the nave is already ornamented with the armorial bearings of all the principal cities of the world, as well as with coloured glass. In the part of the Exhibition which runs along by the side of Avenue Suffren, the road so picturesquely imitated from a street in Cairo is almost finished, as well as the Bazaar Marocain. On the other hand, the Russian and Chinese pavilions are simply indicated by notice-boards. In the gardens, the different foreign palaces are very far advanced. Chili, Venezuela, Bolivia, Brazil, and the Argentine Republic are already showing their very original buildings, which will make this part of the Champ de Mars one of the most brilliant and attractive spots of the whole Exhibition.

Opposite, and on the side of the Avenue la Bourdonnage, are the "Théâtre des Folies Parisiennes," the gas and telephone pavilions, and also that for the Press, which is finished, furnished, and decorated. Lastly, the Rue de l'Habitation, constructed by M. Garnier, by the side of the Seine, is completely finished. In addition, all the buildings near the river (Exposition Maritime et Fluviale), the panorama of the Transatlantic Company, the Palace of Alimentary Products, &c., are, like the agricultural section, almost completed.

As for the Eiffel Tower, it has already attained a height of 280 mètres, and in a month it will be completed by the turret and the electric lantern, which will give it its greatest height of 300 mètres. It is curious to notice to-day how inferior is the effect produced by this enormous piece of ironwork to the idea that people had of it in advance. Seen from the environs of Paris, it overpowers the city, and appears immense by the side of the large monuments, which are reduced to very small dimensions; but the nearer one approaches it, the less is one aware of its colossal proportions, and the eye hardly sees what relation can exist between the thin termination of the tower and the gigantic arches of its base. There is an optical illusion about it which will always weaken its general effect, and disappoint the hopes of the promoters of this useless attempt to astonish the eye by its giddy height. Our first impression about it is not the least altered, and in a decorative and architectural sense the complete Eiffel Tower pleases one no more than its first sketch.

Let us add, to finish our sketch of the Exhibition works, that the total expenditure up to this date has been 29,432,160 fr.,—more than three millions below the original estimate. All the honour of this excellent result is undoubtedly due to M. Alphand, and if the official inauguration is really to take place on May 5, and not to be held, as it was in 1878, in the midst of incomplete installations and empty cases, it will be all owing to his indefatigable activity.

From an artistic point of view, the Exhibition offers considerable interest, and already the excitement in the studios is much greater than it has been in previous years. There will be, in fact, in the month of May, a retrospective exhibition, comprising the *chef d'œuvres* of French art from 1789 to 1889; an exhibition of the art of ten years, from 1878 to 1889, including the most remarkable pictures and statues produced in France and elsewhere during this period; and lastly, the annual Salon, which, from all that we can learn, will not suffer, in spite of the numerous artistic exhibitions going on at the same time. The Exhibition of Water-colours has opened its doors at the same time as in other years. Although very brilliant, it does not include this year many of the painters most known to the public, such as MM. François Détaille, James Tissot, Morot, J. Lewis Brown, and Cazin. On the other hand, MM Harpignies, Besnard, Lhermitte, Le Blant, Heilbuth, and Madame Madeleine Lemaire, have obtained their habitual success. We may mention also amongst the number a series of pretty views of the Park of Saint Cloud, by M. Roger Jourdain.

Almost at the same time, the annual exhibition of the Art Club in the Rue Volney opened. It includes this year 267 pictures and sketches, but, as in all the exhibitions of this kind where amateur talent predominates, the general result is somewhat insignificant. We may except the fine portrait of M. Elie Delaunay, a Flemish landscape by M. Cazin, a "Salomée" by M. Carolus Duran, and some other works by MM. Benjamin Constant, Henner, Damoye, and Montenard. On the whole, however, it is a feeble exhibition; and so is that of the "Femmes Peintres et Sculpteurs," which has for the eighth time taken possession of the Palais d'Industrie.

In regard to "expositions particulières," as they are called here, we may mention that of the works of Feyen-Perrin, which will open on May 1 at the École des Beaux Arts, and will be immediately followed by that of the works of Cabanel. This last, both for the quality and the number of the works exhibited, will be one of great interest.

There is at present at the Hôtel de Ville another exhibition which, side by side with pictures of a certain value, includes works that are absolutely ridiculous. It is connected with a competition opened for the decoration of the Mairie of the XIVth Arrondissement, built by M. Aubertin. Among the designs worth mentioning are those by M. Henri Martin, Lionel Royer, Debon, Leenhardt, and François Flameng. This last deserves the prize, and his designs are charming.

Shortly afterwards there will be a new competition for the decoration of the Mairie of Nogent-sur-Marne, and almost at the same time painters will be invited to compete for the decoration of the Salon called the "Siège de Paris" at the Hôtel de Ville, as well as for the "Galerie à Arcades," parallel to the Salle des Fêtes. We must mention also an architectural competition for the construction of a new Mairie for the Xth Arrondissement of Paris.

At the École des Beaux Arts, a committee presided over by M. Charles Garnier has given its verdict, some days ago, on a competition instituted under the title "Prix de Reconnaissance des Architectes Américains." The subject was "Monument à la Fraternité Artistique," and among the nine designs sent in, the committee has adjudged the prize to M. Huguet, pupil of M. Blondel. The designs submitted in the first class at the École have also been examined, under the presidency of M. Ginain. The subject was "Un Hôtel du Ministre de la Guerre." The first prize was not awarded; second medals were awarded to MM. Recoura and Bossis, pupils of M. Pascal; M. Mougenot, pupil of M. Ginain; M. Pauline, pupil of M. Guadet; and M. Honoré, pupil of M. André. In the "rough sketch" competition, for which the subject was a "Foot Bridge," out of fifty-five competitors second medals were awarded to MM. Guénot, pupil of M. Vaudremer; M. Breffendille, pupil of M. Guadet; and a first mention to M. Charles, pupil of M. Ginain. Lastly, M. Ginain has been presiding over a competition instituted under the title "Prix Edmond Labarre," of which the subject was "A Summer Residence for the President of a Republic." After having examined 152 designs sent in, the jury gave the prize to M. Francastel, pupil of M. Ginain.

In the section of painting a successor has to be provided to fill the place of M. Cabanel, who has also left a void place in the Institut which is eagerly sought for. Among the candidates who are seriously considered are MM. Lefebvre, Jean Paul Laurens, Henner, and Détaille. It is expected that Lefebvre will carry the day.

They are also occupied at the Institut about the formation of a new museum to be installed in the right wing of the Palais Mazarin. The museum is due to the generosity of the Comtesse de Caen, who has left great part of her fortune to pay a pension of 4,000 francs for three years to study at Rome. In return for this legacy, she imposes on the artists the obligation to contribute by their work to the decoration of a museum to bear her name. In conformity with the terms of her will, all the Prix de Rome men since 1876 will figure in the new museum, the entrance money for which is to be given for soup and clothes for poor people.

The transformation of the old site of the Tuileries is at length fairly taken in hand, and thanks to the credit of 280,000 francs recently voted by the Chamber, this large space, so long cumbered with ruins, weeds, and sheds, will soon be a place of plantations, flower-beds, green lawns, and statues, a new *place* open to the public. The "grille d'honneur," which has seen so many Royal cortéges pass, and so many hideous insurrectionist cohorts, has been removed; Prince Stirbey has bought it to ornament his château at Bécon (the place where Carpeaux died). The general aspect of the place will shortly have changed completely, and nothing will recall the civil battles and tumults that have so frequently taken place here. The new square will serve as a frame for the Arc

de Triomphe, built in 1806 by Percier and Fontaine. This elegant monument, inspired by the Arch of Septimius Severus at Rome, is worth a word of description. It is about 14½ mètres high by 19½ in width. Like its model at Rome, it includes three arcades, but it has also a cross arcade. Four Corinthian columns, in coloured marble with bronze capitals and bases, support, on each of the two principal fronts, an entablature, surmounted by a frieze in *griotte* marble. On the entablature, over the apex of each column, is a statue in white marble, representing a soldier of the First Empire. Six marble bas-reliefs, representing some of the battles of the same epoch, adorn the four faces of the monument. The attic is surmounted by a pedestal, on which were placed the celebrated horses of St. Mark, brought over after the Italian Campaign, and returned to Venice at the Restoration. They have been replaced by a quadriga in bronze, directed by a figure of Victory. The group is by Bosio.

Before quitting office, M. Lockroy had organised a Committee to examine the sketches and designs presented for the decoration of public monuments. The new Committee will be composed of forty-two members, presided over by the Minister, and including among its numbers several architects, notably MM. Garnier, Bailly, and Dutert. Thanks to this organisation, instead of wasting the resources of the State in a number of small commissions, one will be able to carry out the decoration of public buildings on a system, and by the selection of the best artists for the work.

The sculptural decoration of the Panthéon will be one of the first questions submitted to the new Committee. According to M. Lockroy's idea, this is what it will consist in. In the hemicycle which terminates the axis of the nave,—that is to say, in the place of honour,—will be a commemorative monument of the French Revolution. At the base of the piers on which the dome rests will be executed four alto-reliefs, symbolising the Mediæval period, the Renaissance, the Seventeenth Century, and the Eighteenth Century, treated in a similar manner to those by Rude on the Arc de Triomphe de l'Étoile. Five funeral monuments will commemorate the celebrities who have the honours of the Panthéon. Before the stair leading to the chevêt will be the cenotaph of Descartes. Between the columns near the entrance to it, will be those of Voltaire and Rousseau. In the two arms of the transepts will be erected the monuments to Mirabeau and Victor Hugo; this last will be raised above the vault where the remains of the poet rest. Lastly, between the columns which extend longitudinally and horizontally will be erected the statues of great men who have assisted France in all manifestations of human thought or energy. These will be selected and arranged in such a manner as to represent the development of French National History. The great artists of the romantic period will be grouped around the tomb of Victor Hugo; the men of the Revolution around that of Mirabeau; the philosophers of the eighteenth century around those of Rousseau and Voltaire. The statues already executed since the first project for decoration, started in 1874, will be placed in front of the engaged columns which serve as frames to the paintings affixed to the walls. At the two extremities of the transepts, in the places now occupied by tapestries which harmonise very ill with the general bright tone of the walls and the paintings, there will be placed against the wall monuments to Lazare Carnot, "the organiser of victories," and to Armand Carrel, Manuel, and General Foy, all of them Liberal orators, celebrated in the contest against the Monarchy of the Bourbons.

Such is, in its main lines, the last project elaborated by M. Lockroy,—understood to be from the ideas or suggestions of M. Laroumet, Directeur des Beaux Arts. The cost of it is estimated at about 2,500,000 francs. It would realise a grand effect, and is well worth executing. But the Ministry has gone out, and political considerations at present push everything else on one side, to the great detriment of the artists.

It is intended to commission from M. Mercié a statue to Alphonse de Neuville, and from M. Rodin a bust of Castagnary, which is to crown the monument to be erected at Montmartre, from the design of M. Faure Dujarric. There is talk also of erecting in the Quartier Latin a statue to Alfred de Musset. M. Chapu has been commissioned by the "Societé des gens de Lettres" to execute a statue of Balzac, which will be placed at the Palais Royal in the Galerie d'Orléans. The same sculptor has made a sketch for the monument to Flaubert, the author of "Salambo." There is also to be noted an intended statue to Victor Noir, who it may be remembered was killed in 1870 by Prince Pierre Buonaparte, whom he had insulted,—a tragic occurrence which gave rise to a "cause célèbre," and was in some sort a kind of prelude to the fall of the Empire. The commission has been assigned to M. Dalou.

DECORATIVE MATERIALS.*

BY PROFESSOR AITCHISON, A.R.A.

ROMAN architecture, from the latter part of the so-called Republic up to the transfer of the capital to Byzantium, was for the most part clothed architecture. I say "so-called Republic," for in reality, from the supremacy of Caius Marius to the assumption of the Empire by Augustus, it was a military despotism, only with two or three despots occasionally instead of one.

From the fact of Roman architecture being clothed, and consequently of its clothing only being seen, we should get but a poor idea of its splendour if the consideration of the visible parts were omitted. Many here have seen St. Mark's at Venice in all its glory of marble, glass, mosaic, and gilding, and we can picture to ourselves what it would be like if it were stripped of its marble linings, its mosaic, and its gilding, and nothing were left but the bare brickwork, and such columns only as are necessary for its support.

Instead of a jewelled casket we should have a dismal brick structure, with a few marble columns and corbels. We get the true aspect of Roman buildings at their zenith from those shown in Italian pictures of the Middle Ages and early Renaissance days.

In a picture by Pinturicchio (1454-1513), from the Appartamento Borgia in the Vatican, there is a triumphal arch. The whole body of this structure is of purple porphyry; the columns are of affricano, or pavonazzetto; the frieze and centre of the attic is of blue; and nearly all the rest, including the capitals, bases, and pedestals of the columns, and the statues, are of gold or gilt.

The Romans did occasionally use pure white marble from Paros, Pentelicus, or Luna; but for the most part, even for column shafts, they preferred coloured marbles. I say "even for shafts," on account of the difficulty of getting sound marble of great length, and large diameter, of coloured marbles that will bear weight. Large shafts are mostly of white marble, grey striped Greek, giallo antico, pavonazzetto, cipollino, or of red or grey Egyptian granite; and when I speak of large shafts, I mean of 3 ft. diameter and upwards. Below this diameter they may be found of all sorts of precious marbles, including red porphyry. One of the most beautiful I have seen is a shaft of verde antique in one of the churches at Venice.

In Roman times, all stucco work, both inside and out, was painted, and often gilt; variegated marbles were largely employed as wall-linings, even in private houses, from the first century B.C.; and bronze, as a rule, was either plated with gold, burnished, or damascened with silver. Slabs of coloured glass were used in his temporary theatre by Scaurus, Sulla's son-in-law; and Pliny the Elder informs us Agrippa would have used glass mosaic instead of encaustic painting for the vaults of his Thermæ, if it had then been invented. In no building did greater magnificence prevail than in the Thermæ; in fact, the only building that ever vied with them was Nero's Golden House. Martial has given a sketch of some of the marbles used in the baths of Etruscus:—

> "There stones in chequered order put,
> From Phrygian rocks and Lydian cut,
> Contending with Taygetus' green
> Marble for gracefulness are seen;
> Fat onyxes there panting sweat,
> And flaming ophites burn with heat."
> Lib. VI., 42, Sixteenth Century MS.

And Statius describes the gables of its halls as being effulgent with various coloured glass, and the water as being conveyed by silver pipes, and falling into silver basins. M. Lepidus, consul (77 B.C.), had used lintels of Numidian marble. Licinius Crassus (140-91 B.C.), the orator, is said by Pliny to be the first Roman citizen who used six marble columns for his hall, about 12 ft. high, of a sort of Cipollino, called Cipolin, and these were from Mount Hymettus, for which he was called, by Marcus Brutus, the "Palatine Venus." Scaurus imported 360 columns of the Lucullean marble, 38 ft. high, for his temporary theatre; these were afterwards used in his house, the sewer contractor compelling him to give security for the possible damage to the sewers while they were being moved through the streets.

As we do not want to trace chronologically the spread of Roman magnificence, it may be perhaps as well to give the Latin and Italian names of some of the principal marbles and fine stones used by the Romans in their buildings. I have followed Corsi in the arrangement, I have consulted Mr. Burnham's book, and in all cases alluded to Mr. Brindley's personal survey of ancient quarries, when this differed from the other two. I may mention that in the allusions to marble made by the Latin poets the neighbouring towns, mountains, or rivers are often used to denote the sort of marble, when these are more convenient for the versification.

I did translate and abstract from Corsi his description of the white, coloured, and figured marbles, the serpentines, alabasters, granites, porphyries, and murrha, with the situation of the quarries, where known, and the few ancient buildings in Rome where these marbles and fine stones were used, and are still to be seen; but seeing that there are more than one hundred different descriptions, which extend to over twenty pages of manuscript, I thought that human endurance would not suffice for this infliction, so I shall publish the list on the walls.* I am sorry I am obliged to omit reading it, not only because it may be of use to Classical scholars, and because the bulk of all the fine marbles in the world have been taken from the buildings of the Romans, but because we have in England the two magnificent and, I believe, unique collections of specimens made by the learned Corsi; the grand one at the Oxford Museum is contained in two cases, which were removed into the light for me to see, some years ago, by the kind offices of Sir Henry Acland. Corsi's own private specimens, about 1½ square, set in slabs of white marble, are now in the Geological Museum, Jermyn-street; here they are put up vertically, under windows, but they can be seen if you kneel down, and have the use of a lantern, though I may say that marble of this size is practically useless for identification, as in veined and brecciated marbles pieces might be cut out which would not only give a perfectly erroneous impression, but which might make one believe that a fine brecciated marble of green or purple was pure black or white, and in cases of large breccias and in other marbles containing masses of large veining, interspersed with a plain ground or large flowering, even when the specimen is most characteristic, you cannot get the proper effect of the pattern, nor of the striking contrasts. I may also remark that though some ancient quarries may yet be undiscovered, it is quite possible that many of the varieties were got from quarries near at hand.

When there was such a passion for coloured marbles, and when people doubtless paid extravagant prices for rare pieces supposed to come from distant parts, it is most likely that the site given was in many cases imaginary, particularly when we know that almost all large quarries produce a variety or different coloured marbles. At Siena, for example, there are forty varieties, ranging from black to white.

I may here mention that I think I have discovered the Classic name of Rosso Antico—it was Marmor Tænarium, like the Nero Antico, its quarries being comparatively close to them. These quarries having been re-discovered, Rosso Antico is now by no means a very costly marble. I have used it occasionally within the last twenty years for slabs, fenders, and panels.

The Numidian marbles have also been re-discovered in Tunisia and Algeria. The quarries of the celebrated giallo antico are in Tunisia, of which half the large interior columns of the Pantheon are made, and those to the Arch of Titus.

The misfortune of Corsi's grand collection being at Oxford is twofold, even excluding the fact that the specimens cannot be properly seen. Oxford is a long way off, and is not a centre of marble working, and consequently it is next to impossible to carry down to Oxford specimens of adequate size to compare with the

* Being the fifth Royal Academy Lecture on Architecture this Session, delivered to the students of the Academy on the 11th of February last. (For the previous lectures see *Builder*, pp. 85, 103, 121, 142, *ante*.)

* This list of marbles will be published in the *Builder* next week.

antique ones. That his own specimens are put where they cannot be seen is a scandal. I am not complaining of the authorities at the Geological Museum in London, as they have no room. The Museum wants enlarging to double or treble its size. The very object for which it was made cannot, for want of room, be carried out, *i.e.*, the showing to the public adequate specimens of all the marbles of the United Kingdom, its dependencies, and colonies. We take so little interest in architecture and the arts connected with it that if a book of antique marbles, with proper coloured illustrations, were published, it would not pay its expenses. It must be done by some wealthy and enthusiastic patriot. Even our finest public and semi-public buildings are not published, except here and there in a French work—St. Paul's Cathedral, the Houses of Parliament, St. George's Hall, Liverpool, the Taylor and Randolph Buildings, for instance! The Reform Club has been published by M. César Daly in his "Revue Générale." Mr. Burnham, in his book on limestones and marbles, has only given forty-eight illustrations; eight, at least, are of American marbles, eight of Algerian onyx and modern marbles, and thirty-two of antique marbles, and the plates are only 3¼ in. by 2¼ in.

From Algeria comes an ivory-coloured marble, the magnificent crimson breccia, the Algerian onyx, and other coloured marbles.

Murrha.—This has had an infinity of writing bestowed upon it, and were we to be guided solely by the description, we could not doubt Corsi's solution that it was Derbyshire fluor spar, commonly called "Blue John"; the colour is like, the softness that may be crushed by the teeth is like, and its treatment with mastic and shellac makes its odour the same, which would be still more powerful if warm fluids were poured into cups of it; and he found antique specimens of it: but when it is first spoken of England was unconquered, and, as far as I know, no trade in fluor spar was carried on. The cups, &c., taken from Mithridates by Pompey the Great are the first that are mentioned, and Pliny says it came from the land of the Parthians, and the best from Carmania, now Persia; mainly from this last circumstance, modern mineralogists consider it to have been an agate or jasper from Siberia. Pliny says alabaster is so-called from the town Alabastron, on the Nile (El Molmar).

Oriental Alabaster. — Corsi believes that Oriental alabaster and onyx were often confounded. Onyx is said to be so called from the Greek word ὄνυξ, the nail, from its resemblance in colour to the human nail. He quotes Genesis (chap. ii, v. 11, 12):—"The name of the first is Pison; that is it which compasseth the whole land of Havilah, where there is gold; and the gold of that land is good; there is bdellium, and *the onyx stone*;" and says Calmet believed this to be Oriental alabaster. The hard Oriental alabaster is carbonate of lime, and very much harder than our tender alabaster, which is sulphate of lime. Pliny says:—"It is found in the vicinity of Thebes, in Egypt, and of Damascus, in Syria, that of Damascus being whiter than the others. The most esteemed kind, however, is that of Carmania, the next being the produce of India, and then those of Syria and Asia. The worst in quality is that of Cappadocia, it being utterly destitute of lustre. That which is of a honey colour is the most esteemed, covered with spots curling in whirls, and not transparent. Alabastrites is considered defective when it is of a white or horn colour, or approaching to glass in appearance."* That which he says is most esteemed precisely represents the columns of the baldachin in the Basilica of "St. Paul's without the Walls" at Rome, the shafts of which are in several lengths, and were sent to the Pope, Gregory XVI., by Mohammed Ali, the then Viceroy of Egypt.

Lapis atracius, verde antique, is said to come from Thessaly, and to have been so called from the neighbouring town of Atrax, close to the river Peneus, and not far from Larissa. The quarry was said to be worked on the open plain. A quarry was found in Thessaly by Mr. Brindley, but not in this situation. What we know as verde antique is a brecciated marble, fragments of snow white and black being imbedded in a green paste. The rarest specimens are said to have blue in them. The green varies from a heavy bluish dark green to the most brilliant emerald green. The finest specimen of this last sort I have seen is a table-top at Dorchester House. There is also a lovely column of verde antique in one of the Venetian churches, which Signor Boni had repolished.

There are only two marbles that have retained the names of the ancients who used them, *Marmor Luculleum* and *Breccia di sette Basi*, and one only named by the ancients Marmor Luculleum, Bigio Morato, a bluish-black marble that looks as if it were dusty, said to be quarried in in the island of Melas, in the Nile. The Breccia di sette Basi was so called by the moderns because it was found in the ruins of the villa of Septimius Bassus, on the Appian Way. It has a purple ground, covered with oblong fragments of a dull white, mixed with red and yellow, and when the pattern is small, it is not unlike the Breccia a seme Santo, so called from its resemblance to the coloured sugar-plums containing physic which are given to children; one of the columns to one of the pulpits of St. Mark's, Venice, is said to be of it, and the late Mr. Burges believed he had the frustum of a column of it in his hall at Melbury-road, Kensington.

Marmor Synnadicum—Pavonazzetto. — This was called by the ancients indifferently Synnadicum, from the town of Synnada; Dociminian, from the town of Docimia; Migdonian, from the province; and more commonly Phrygian, from the country. It is mentioned by Strabo (l. 12, c. 3, s. 14), by Ovid, Horace, Tibullus, and Juvenal. The quarries have lately been rediscovered by Mr. Brindley. It is a white marble with red and purple veins; the best with purple patches, and the white is sometimes of the colour of old ham fat. It was one of the few marbles of which large shafts were made—half the large interior columns of the Pantheon are of it. Hadrian was a great admirer of it, and is said to have used it in his mausoleum. It is translucent, and used for glazing the chancel windows at San Miniato, Florence.

Porphyry—Lapis Porphyrites.—The quarries of the true Egyptian purple porphyry were found by Mr. Brindley close by Gabel Duchan, within a reasonable distance of the port of Abu Shah El Kibble, on the Red Sea, and the material may of course now be had at a reasonable price. It never can be cheap, on account of the distance it has to be brought and the expense of working it. The main body is a fine purple red, containing small fragments of pale purple, occasionally almost white; and there is another variety, in which the ground is rather heavier and duller, with yellowish-white specks. There are grey, black, and invisible-green varieties; these mostly have the white specks. On account of its extreme hardness, it is used for mortars and slabs for grinding colours, as well as for decorative purposes.

Green porphyry, called by the Italians serpentino, and by Martial the green metal of Taygetus, is from Mount Taygetus, called the five fingers, in Laconia, Peloponnesus, and is spoken of by Strabo as having its quarries very lately opened by the Romans near the Tænarian quarries (lib. 8, cap. 5). This is of a full, yellowish, dark green colour, containing fragments of almond shape of lighter green, sometimes almost white, and takes a brilliant polish, and is rarely found of any considerable size; there is a small piece on the wall I found at Hadrian's Villa, which seems to have been used as an inlay. Senior Boni sent me a piece from Aquileia that had been burnt to a deep purple-red colour when that city was burnt by Attila.

Fine Stones.—It is hardly necessary to describe lapis lazuli. The two sorts best known to us are the dark azure blue, with veins, or powdering of gold, which is, in fact, nothing but iron pyrites, and the sky-blue interspersed with white. It was called Cyanos by the Romans, or, at least, the male* was so called, and Pliny describes the best as coming from Scythia, the next best from Cyprus, and the worst from Egypt, and he says it has the appearance of being powdered with a golden dust. (Nat. Hist., lib. 37, c. 38). Sapphirus, however, was its ordinary name, and, according to Pliny (Nat. Hist., lib. 37, cap. 39), the best comes from Media. According to him, this is the female stone. It is now found in Persia, Bucharia, Grand Tartary, China, and also in Austria. Venuti says that a pavement of lapis lazuli was found in one of the halls of the Thermæ of Titus, in the Pontificate of Innocent the Tenth (1644-1655). The most superb thing I have seen in lapis lazuli, which looks as if it might be a bit of that pavement, is in the possession of Messrs. Farmer and Brindley. I have mentioned lapis lazuli because it is the only real blue that can be got except in precious stones, all the blue marbles being but a bluish grey.

Lapis Mithrax—Labrador Spar.—Pliny says (Lib. 37, cap. 63):—"Mithrax comes from Persia, and the mountains of the Red Sea; it is of numerous colours, and reflects various tints when exposed to the sun." It is now said to be found in Greenland, Iceland, Norway, near St. Petersburg, in the Hartz Mountains, and in America; besides the Island of St. Paul, off the coast of Labrador, Canada, from which it gets its name. Corsi does not say that he ever found any antique specimen. It is now often used as an inlay in wood or marble, and if set at an obtuse angle to the light gives the most lovely peacock hues. I have so used it, but the only public place I know where it has been used is at the schools at Oxford.

Molochites, Malachite.—Pliny says (Nat. Hist. Lib. 37, cap. 36):—It is not transparent, being of a deeper green than smaragdus (the emerald); its name is derived from the mallow, the leaves of which it resembles in colour. It was highly esteemed for making seals. Corsi says nothing about finding any pieces that have been used in decoration.

Margarita (a fine specimen is called unio), perla, a pearl).—Our word is supposed to be derived from perna, a ham; hence pernula, a little ham. Pliny says:—"Perna, too, is the name given to a kind of shell-fish in the Euxine. These fish are found firmly planted in the sand, resembling in appearance the long shank of a hog." He thus explains the occurrence of pearls:—"When the genial season of the year exercises its influence on the animal, it is said that yawning, as it were, it opens its shell, and so receives a kind of dew, by means of which it becomes impregnated, and that at length it gives birth, after many struggles, to the burden of its shell, in the shape of pearls, which vary according to the quality of the dew" (Nat. Hist. Lib. 9, cap. 54).

Procopius, De Bell. Pers. (Lib. 1, cap. 4) tells the following story:—"The sea-dogs are wonderful admirers of the pearl-fish, and follow them out to sea; when the sea-dogs are pressed by hunger, they go in quest of prey, and then return to the shell-fish and gaze upon it. A certain fisherman having watched for the moment when the shell-fish was deprived of the protection of its attendant sea-dog, which was seeking its prey, seized the shell-fish and made for the shore. The sea-dog, however, was soon aware of the theft, and, making straight for the fisherman, seized him. Finding himself thus caught, he made a last effort and threw the pearl-fish on shore, immediately on which he was torn to pieces by its protector."

Though I daresay pearls were occasionally used in decoration, Pliny does not mention the circumstance. I think it quite possible that mother-o'-pearl was combined with glass mosaic, instead of white or silver, as we now find it used in Saracen mosaic, all of whose early mosaic was supplied from Byzantium. Suetonius (Nero, cap. 31) says part of Nero's golden house was entirely overlaid with gold, and adorned with jewels and mother-of-pearl.

Mosaic was called *opus musivum*, which is equivalent to "artistic work." Pliny calls it *lithostrota*, and says "it was first introduced by Sulla, and that there is still in existence a pavement formed of small segments, which he ordered to be laid down in the Temple of Fortune at Præneste"; but whether this was true mosaic or opus sectile, I do not know. The word used at Byzantium was *phesphesis*, from the Greek word psēphis, a pebble. Phsefesis is called by the Saracens *fesfysa*. One of the conditions of peace between the Caliph Walid and the Roman Emperor, in the early part of the eighth century, was that the latter should furnish a certain quantity of *fesfysa* for decorating the mosque of Damascus. Pliny goes on to say:—"Since Sulla's time these mosaics have left the ground for the arched roofs of houses, and they are now made of glass."

I have given a rough description of the floor and terrace mosaics at Caracalla's Thermæ, though on my last visit to Rome I did not see the mosaic of the Exedræ with the Athletes, this pavement having been moved to the Lateran Museum; these are said to be of fine stones. While at Rome I paid a visit to Hadrian's Villa, and I there saw a wonderful floor of mosaic; the whole room was covered with

* Pliny's "Nat. Hist.," Book xxxvi., cap. 12.

* Stones were divided into male and female by the Romans.

earth, but they cleared a piece for me to see. The mosaic was very ugly in pattern, and staringly vulgar in colour, but from this very fact I think the materials must have been jasper, agate, chalcedony, and carnelian; the cubes were about ¼ in. square, so that it looked like a bit of Berlin wool work.

Aurum = Gold.—Massive gold does not seem to have been much used by the Romans as a decorative material, though Pliny mentions (Lib. 36, cap. 22) a temple at Cyzicus of polished stone, between the joints of which the artist had inserted a thread of gold; and golden reeds were used in the joints of the marble shrines at the temple of Zeus Olympios, by Hadrian. A gold fillet may be seen in the base of a column at the British Museum, and gold in connexion with marble was much used at Jerusalem; we read of the golden vines there. Gilding excites Pliny's wrath; he says (Lib. 33, cap. 18):—"The ceilings which at the present in private houses even we see covered with gold, were first gilded in the capitol after the destruction of Carthage, and during the censorship of Lucius Mummius. From the ceilings this luxuriousness has been since transferred to the arched roofs of buildings and party walls even, which at the present day are gilded like so many articles of plate, very different from the times when Catulus was far from being unanimously approved of for having gilded the brazen tiles of the capitol.

Pliny describes gold as being excavated by ants in the North of India, and says (Nat. Hist. Lib. 11, cap. 36):—The ant "has the colour of a cat, and is in size as large as an Egyptian wolf." Sir John Maundevile, who says he went abroad in 1322 A.D., in chap. 30 of his voyage, very amusingly enlarges on this statement, as if he had himself seen the ants digging the gold.

Argentum = Silver.—I have already mentioned the silver pipes and labra in baths. The extent to which the use of silver was carried in baths moved the wrath of Pliny (Nat. Hist. Lib. 33, c. 54,—12 in Bohn's translation). He says:—"Our women, when bathing, quite despise any sitting bath that is not made of silver, while for serving up food at table, as well as for the most unseemly purposes, the same metal must be employed! Would that Fabricius could behold these instances of luxuriousness, the baths of our women,—bathing as they do in company with the men,—paved with silver to such an extent that there is not even room left for the sole of the foot!"

Æs = Bronze.—Bronze statues were so numerous in Rome that the wits said there were more brass men than real ones, and the word "statuary" meant a brass founder, and is generally so used by English writers who are familiar with the classics,—the late Mr. King, to wit,—and as it is a word much wanted, I also use it in this sense, and not in the sense in which it is used by the artificial stone-makers of the New-road.

Pliny says Scaurus had three thousand statues erected on the stage of what was a temporary theatre only, and Juvenal tells us that basins and frying-pans were made out of the statues of the great Sejanus.

The Romans employed several sorts of bronze,—Corinthian, Delian, Æginetan, and Hepatizon, or liver-coloured, speculum metal, and Aurichalcum,—this latter is supposed to be either brass or mosaic gold. Brass, as you know, being copper and zinc, or copper and lead, while bronze is copper and tin. Pliny says it is curious that they stain it when made into statues with bitumen, as statues are mostly gilt; and he tells us that Nero had a statue by Lysippus of Alexander the Great when an infant, which so delighted him that he had it gilt; "this addition, however, to its value, so detracted from its artistic beauty that the gold was removed, and in this state it was looked upon as still more precious, though disfigured by the scratches and scams which remained upon it, and in which the gold was still to be seen" (Nat. Hist. Lib. 34, cap. 19).

Besides the statues of Alcibiades and Pythagoras, that were erected in Rome, Pliny,—if I read him aright,—says "that statues of Hannibal, even, are to be seen in three different places in that city, within the walls of which he alone of all its enemies had hurled the spear" (Nat. Hist. Lib. 34, cap. 15). Besides equestrian statues, and those in chariots, Rome contained many colossal statues, Apollo in the Capitol, brought by Marcus Lucullus from Apollonia, 45 ft. high, which cost 500 talents (121,875*l.*); a statue of Jupiter, close to Pompey's Theatre; the Tuscan Apollo in the Library of the Temple of Augustus, 50 ft. high; Nero's statue, 110 ft. high: Vespasian changed the head for one of the sun, and we must suppose that the statue was built, as Pliny says Zenodotus, the statuary, was unable to cast it, and thus this statue proves that the art of fusing brass was then lost. The other colossi of those days were: one at Tarentum, 60 ft. high, too big to be removed to Rome; one of Mercury, made by Zenodotus, and put up in the City of the Averni (Clermont Ferrand), which took ten years to complete, and cost 400,000 sesterces, roughly 3,531*l.*, and which, he says, was the largest of our own age. There is probably some mistake as to the cost, and sesterce has been mistaken for sestertia, which would make it 353,160*l.* As he tells us that one 45 ft. high costs 500 talents, 121,875*l.*, this sum does not appear out of proportion.

There was also the colossal statue of the sun, which stood formerly at Rhodes, and was the work of Chares, the Lindian, a pupil of Lysippus, no less than 70 cubits in height = 105 ft. It was finished by Laches, of Lindos, Chares having committed suicide.

"This statue, fifty-six years after it was erected, was thrown down by an earthquake; but even as it lies, it excites our wonder and admiration. Few men can clasp the thumb in their arms, and its fingers are larger than most statues. Where the limbs are broken asunder, vast caverns are seen yawning in the interior. Within it, too, are to be seen large masses of rock, by the weight of which the artist steadied it while erecting it. It is said that it was twelve years before this statue was completed, and that 300 talents were expended upon it (only 73,125*l.*); a sum raised from the engines of warfare, which had been abandoned by King Demetrius (305 B.C.) when tired of the long-protracted siege of Rhodes" (Nat. Hist. lib. 34, cap. 18).

Gibbon says, "but the massy trunk and huge fragments lay scattered eight centuries on the ground, and are often described as one of the wonders of the ancient world. They were collected by the diligence of the Saracens, and sold to a Jewish merchant of Edessa, who is said to have laden 900 camels with the weight of the brass metal" (Gibbon, "Decline and Fall," cap. 51). This was in the days of Moaweyah, who died 679 A.D.

I mentioned the bronze bosses for the lamps, still remaining on the vault of the tepidarium at Diocletian's Baths (now the Sta. Maria degli Angeli). Bronze doors were at first confined to temples and public buildings, but were eventually used for private houses.

The Temple of Vesta and the Pantheon had their roofs covered with bronze, and the latter had the eye lined with it, if the whole inside of the cupola was not lined too, and the original inside capitals were also of bronze. We have heard of the brazen girders and lattices at Caracalla's Thermæ, as well as those of the portico of the Pantheon. Window-lattices are believed to have been of bronze, though lead lights were found at Herculaneum.

I give you an amusing story about Corinthian brass from the Satyricon of Petronius: Trimalchio, the freedman, who is the picture of a vulgar Roman millionaire (he was, in fact, sixty times so, for a million sesterces was only about 10,000*l.*, and he tells us he had sixty millions). Being anxious to show the extent of his wealth and learning to his guests, he had the news of what had occurred in his domain read out between dinner and dessert, and when he hears of a fire in the gardens of Pompey he asks when they were bought, and being told the year before, he says unless he is told within six months of any purchase he will not admit it in his accounts, and talks of adding Apulia to his domain. A guest examines a bronze salver, when the host says, "I am the only man who has the real Corinthian. Perhaps you will ask why I alone possess real Corinthian? It is because the brass-founder I buy of is called Corinth, and what is Corinthian but what you get from Corinth? But lest you should think me an ignoramus, I know very well the origin of Corinthian brass. When Troy was taken, Hannibal, a cunning fellow, and a great rascal, heaped all the brazen, golden, and silver statues on a pyre, and set it on fire; a mixed bronze was thus made. From this mass the braziers helped themselves, and made plates, dessert dishes, and statuettes. This is how Corinthian brass was made,—one substance out of all, neither one thing nor the other."

Vitrum = Glass.—Pliny's story of the invention of glass by some merchants on the coast of Syria (l. 36, c 65), who supported their cauldrons for cooking on lumps of nitron, which, he says, being subjected to the action of fire in combination with the sand of the seashore, caused streams of a transparent liquid, hitherto unknown, to flow forth, which was the origin of glass, is said by glass-makers to be fabulous, as no heat so engendered would be sufficient; and the most likely story is, that a forest on an abrupt mountain in Syria taking fire, the pot-ashes so made, mingling with the sand, were melted by the intense heat, and glass flowed down the side of the mountain. Be this as it may, Tyre and Sidon were early famous for their glass, and the Egyptian glazes are said to vitreous. The celebrated blue glaze, by which they imitated sapphiros or cyanos (lapis lazuli), is said to be vitreous, pieces of which were found in a frieze at Tirhyus. Pliny tells us in his day that the magnet-stone was added to glass, as well as other brilliant stones, and at last shells and fossil sand, and says some authors tell us that the glass of India is made of broken crystal, and that, in consequence, there is none that can be compared to it. Glass, he says, is blown into various forms, turned in a lathe, or engraved like silver. Obsian glass, made in imitation of Obsidian, was used for casting statues,—he mentions one of Augustus,—as well as for table services; he also says red and white opaque glass was made, the latter being like murrha, and that if glass be burned with sulphur it becomes as hard as stone. Martial tells us it was a common practice to exchange broken glass for brimstone matches (Lib. i. Ep. 42):—

"Like those who i th' suburbs making cry
For broken glass, who'll matches buy,"

and in Lib. x., Epig. 3, he says of the verses of his imitator, Cæcilius, that a dealer in broken glass would not buy them for a brimstone-match. It is supposed, with what truth I know not, that the glass slabs in imitation of jasper, agate, and lapis-lazuli were so treated. There are many specimens at the British Museum. It is also believed that the second story of Scaurus' temporary theatre was lined with slabs of this glass, and that possibly the columns were made up of hollow glass frusta.

Pliny says glass had superseded the precious metals for drinking-vessels, and before his time our friend Trimalchio had given the same opinion. He says:—"Excuse what I am going to say; I would rather have glass drinking-cups; some would not. If they could not be broken, I would rather have them than gold ones, but now they are very cheap." He then tells the following story:—

"There was an artificer who made a glass vase which could not be broken. Being admitted to Cæsar with his gift, he made Cæsar give it back, and threw it on the pavement. Cæsar could not help being alarmed, but he picked up the vase from the ground. It was bruised as a brazen one would have been. Thereupon he drew forth a little hammer from his breast, and perfectly reshaped the vase at his ease. This being done he thought he was in Jove's heaven; so that after the Emperor said to him, 'Does any one else know of this annealing of glass vessels? See now.' He denied it. Cæsar commanded him to be beheaded, because if it should be known we should value gold like clay" ("Pet. Satyricon," cap. 51).

Pliny says that this story about Tiberius was for a long time more widely spread than well authenticated. "But be this as it may, it is of little consequence, for in the time of the Emperor Nero there was a process discovered by which two small glass cups were made of the kind called 'Petroti,' the price of which was no less than 6,000 sesterces" (53*l.*), and I suppose he means by this that the glass was malleable.

You will see by the pieces of old Roman glass on the table that there are specimens of imitation lapis lazuli and of opaque red and white glass, ribbed and twisted glass, the filigree of laticino, the mosaic, mille fiori, and the striped and banded in various colours, as well as imitations of onyx, banded agate, and jasper, one piece with raised letters on it; and that many of the blues, greens, and ambers are most lovely in colour.

The ruins we have seen at Rome, and the drawings we have admired in exhibitions, are mostly of a deep yellow or yellowish-red, and make so strong an impression on us that we oftener picture to ourselves ancient Rome as a city of dingy brick or of golden-coloured stone, with the people in white togas with here and there a purple stripe—in fact, as a drawing in white, black, and red chalk—than as a picture resplen-

dent with colour. I thought therefore it might not be amiss to give you a long list of the various coloured marbles, the glass, the gold, the silver, and the bronze, to bring you back to what, in fact, was a splendidly-coloured scene; also in the hopes of stimulating those to whom the gift of colour has been vouchsafed to bestow a deep and loving study to its harmonic arrangement. Even in the days of Augustus the white toga was getting out of fashion, and its place was being filled with clothes of more splendid colour, even when the Romans in office kept to the white toga with its purple border. You must recollect that almost every one was escorted by troops of servants and pages, splendidly dressed; many were carried about in litters of rich woods, inlaid with ivory, amber, tortoiseshell, and gold, with embroidered curtains and green, crimson, and purple cushions.

In interiors the effects were still more gorgeous. I think every one must feel the necessity of splendid colour, when the very pavement you trod on was of lapis lazuli; there the walls must necessarily be lined with rosso antico and black marble, or with pavonazzetto enriched with opus sectile, with green and purple porphyry, onyx, Oriental alabaster, affricano, and verd antique, the vaults gleaming with glass mosaic and gilded bronze. Imagine that you were walking in those sumptuous and colossal halls, amid plashing fountains and the masterpieces of the Grecian chisel!

During the last century of the Republic, generals and statesmen, captains and soldiers, sutlers and camp followers had become familiar with the gorgeous trappings of the East, with the splendours of the Greek kingdoms in Asia, with the magnificence of Persia, of Babylon, of Syria, and of Egypt; with men whose hair was adorned with golden grasshoppers, and whose curls were enclosed in golden nets, whose arms and armour were damascened with gold and silver, and studded with jewels; whose cloaks and tunics were of costly stuff and of gorgeous colours, often storied by the Attalic or Babylonian needle; with girdles of engraved gems, and chains of silver or of gold dangling and clinking on the embossed scabbards of their swords; with jewelled earrings, and with golden bracelets and bangles on their wrists and ankles: they had drunk from jewelled cups, and played backgammon on boards of precious stones, with pieces of sculptured gems or embossed gold; had seen or handled the chased gold scabbards beyond price, the hilts of engraved gems, and the famous damascened ecaliburs of Eastern conquerors, whose very horse-trappings were heavy with jewels and with gold. Probably many a silken curtain embroidered with gold and precious stones, torn from the beds or tents of Eastern potentates, kept the draught from the halls of Roman baths, where the populace bathed for a farthing; not to speak of the magnificence of Sulla, the Luculli, and Pompey the Great, we know that Julius Cæsar gave his shoe to be kissed by those he pardoned at Pharsalia, and when some one remarked on this Oriental arrogance, his friends said it was not done from haughtiness, but in the hope that they might see and admire the fine pearls, and the engraved gems with which they were adorned. Pliny tells us that Julius Cæsar and young "hob-nails" Caligula were great bucks in their dress, and were very fond of having their slippers embroidered with pearls. In one of his diatribes, he says, "Let women wear gold upon their arms and all their fingers, their necks, their ears, the tresses of their hair; let chains of gold run meandering along their sides, and in the still hours of the night let sachets filled with pearls hang suspended from their necks, all bedizened with gold, so that in their very sleep, even, they may still retain the consciousness that they are the possessors of such gems. But are they to cover their feet as well with gold? Much more becomingly do we accord this distinction to our pages, and the adorned beauty of their youth has quite changed the features of our public baths."

Greek Mouldings Illustration Fund.—Mr. Penrose announces the following further subscription to this fund:—

Messrs. Carpenter & Ingelow..... £2 2 0

Obituary.—We regret to hear that Mr. Charles Richard Pink, F.R.I.B.A., died at Winchester on the 25th of February, in his 36th year. He will be well remembered by many of our readers as a recent President of the Architectural Association.

RUSTLESS IRON.

A SHORT time since a party of architects and experts were invited to see a large heat of iron pipes subjected to the Bower-Barff process of coating with magnetic oxide. One remembers very well indeed the great interest which was excited some twenty years ago by the invention of the late Professor Barff, and the display at the Royal Society and at other learned societies of gratings, tubes, brackets, and a variety of other articles, including swords and gun-barrels and other highly-polished articles. From that day to this one has never ceased to hear of Barff's process, but apparently the rustless wares and goods have not come into such extensive and every-day use as might have been expected. In fact, the special display in question may be taken as a reminder to a very practical profession that there is ample scope for a very much wider recognition of the Barff process in architectural and building specifications. The works at Skin Market-place, on the Bankside of the Thames, by Southwark Bridge, are small, but very interesting, as containing, first, the original Barff apparatus, and, secondly, the more complete and satisfactory Bower modification.

The process itself is very simple, and based on almost elementary chemical principles. The iron goods are heated to glowing redness, and then a continuous current of superheated steam is allowed to play upon the radiant mass. Oxygen from the steam is absorbed by the heated iron wares, and a double oxide is formed superficially, and penetrates in depth into the mass of the metal, according to the length of time the action is allowed to go on. Generally in practice this permeation is kept within the limit of the $\frac{1}{64}$ of an inch, and the time of operation under twelve hours. The term "rustless" is thus seen to be in one sense a misnomer, for the iron is really double rusted to the extent that it cannot rust any more when so coated. Exposed to the ordinary wettings and dryings and weather action, articles such as gutter-gratings, rain-water pipes, and railings, endure for a very long time before they undergo the slightest change or reduction of condition. It is still possible after severe attack, continued for very considerable periods, that the peroxide should begin to be robbed of one particle of its oxygen, and be reduced spot by spot to the condition of the common red rust, or single oxide. It is, however, correct in a general sense to call the wares so produced "rustless," because the process is undoubtedly a preservative whose influence is very slow indeed in giving way, and the Bower-Barff process will compare in efficacy very favourably with paints and lacquers.

The practical value of the process, indeed, over the ordinary paint coatings may be well illustrated in the matter of the down rain-pipes from roof to ground. For repainting these, long ladders and other paraphernalia are needed, and even then the workmen cannot well get at the rear of the pipes contiguous to the walls. Long lines of rust may consequently be almost universally observed in this vertical interspace, causing rapid decomposition of the pipes. For pipes which had been submitted to the Barff process there would be no more deterioration on the one side than the other; whilst for years there would be no need of repair. If any such need arose, the pipes could be taken down and reprocessed.

The limitation of the time and of the extent to which the process shall extend have for their object the prevention of any sensible decrease in the strength of the iron goods. The superficial protection is all that is really required, and the extent of its permeation need be no more than will suffice to avoid injury by external bruises. In experimental tests made by the late Sir Joseph Whitworth on some pipes of ordinary and processed metal, it was shown that under various pressures, there was no appreciable difference up to twenty-one tons; with twenty-two tons' load, before the process, the deflection was 0·0002 of an inch; after the process, with twenty-one tons, it was 0·0008; with twenty-three tons before process, 0·0008; and with twenty-two tons afterwards, 0·0022 of an inch. By these tests, therefore, some approximate knowledge on that point can be clearly gathered.

In the original Barff apparatus the iron goods were placed within a large iron cylinder, heated on the outside, the heat radiating through the wall of the cylinder, and so bringing the goods within it to a bright red heat. Superheated steam was then admitted into the cylinder, and the process performed, the hydrogen liberated escaping by a pipe. In the Bower process the cylinder is abandoned, and there is substituted a large fire-brick chamber. The furnaces are built in separate compartments, about 8 ft. high by 4 ft. broad, and these are fed with coal from above, a small draught being admitted below to the extent sufficient for gas to be continually generated. This gas is admitted in a continuous stream into the heating-chamber, where it is met by a corresponding current of air, which has worked its way from the outside atmosphere by numerous pipes descending into the earth and rising again underneath the hot-chamber in such a way as to get well heated in its passage. The combustion of the air and gas is thus rendered perfect, and a fine glowing heat is maintained in the chamber.

The goods, placed on a long trolly on sixteen wheels, are run into this chamber, the ends of which, are then closed up. After a time, when the goods are thoroughly hot, the gas fire is cut off, and the superheated steam current, generated in a separate boiler, is introduced and kept up for some hours, according to the nature of the work in hand. No special provision is made for the escape of the residual hydrogen from the steam, which gets away as best it can through the brick structure of the chamber and through the fire or chimney stack. Such furnaces can be easily managed, and may be erected in any provincial district and attended to by ordinary labour. There is therefore no difficulty either in the process itself, or in the multiplication of small works for local operations by which the more expensive transport to any distant central station or works would be avoided. The cost is, perhaps, a little high, and this may be the chief reason of its hitherto limited adoption. As gilding, silvering, and painting on a "rustless" surface has perfect adhesion and will not flake away nor blister, there are many subsidiary advantages attached to the process which should cause the leading men in practical undertakings to give attention to it as having results which are really scientific and useful.

ARCHITECTURAL ASSOCIATION VISITS.

THE second visit of the present session was made by some of the members of the Association on Saturday last to several buildings in course of erection from the designs of Messrs. Martin & Purchase, in Charing Cross-road and Shaftesbury-avenue. The first building visited was that at the junction of Charing Cross-road, Oxford-street, and High-street, Bloomsbury, known as Imperial Mansions. This building is arranged on a semicircular site, and consists of a range of shops on the ground-floor, with basements under, communicating by means of a circular iron staircase. The upper stories, which are separated from the shops by a fireproof floor, are planned for letting as residential flats or offices. Access to the upper floors is obtained by a staircase of fireproof construction, but somewhat awkwardly planned, and a hydraulic lift is also provided for the use of the tenants. The divisions between the rooms on the upper floors are constructed on Mr. Middleton Edwards's fireproof system, and consist of light rolled iron standards, between which is placed thin sheet-iron rolled with rectangular corrugations to support the plastering, thus forming a finished partition only 3 in. thick. Accommodation is provided on the top-floor for a caretaker, who will be enabled to supply meals for tenants, if required. The exterior elevation is carried out in red brick with Beer stone dressings; but the design and detail can hardly be said to be worthy of the important position which the building occupies.

After inspecting these buildings, the members next proceeded to Cambridge-circus, where they visited the block known as Harrington Buildings, which, like the former, consists of shops on the ground-floor, with residential rooms over. In this case, however, the block of buildings is sub-divided by party-walls, so that the shops can be let either with the rooms over them or independently. The visitors afterwards proceeded to inspect a number of shops in Shaftesbury-avenue, which are of ordinary type, the rooms on the upper-stories forming part of the same tenements as the shops. This completed the visit, which was rendered instructive by the explanations of the architects, who accompanied the visitors throughout the afternoon.

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Illustrations.

THE NEW WELLINGTON STATUE.

WE give this week a view, reproduced from a photograph taken specially for us, of the Wellington statue at Hyde Park-corner, together with illustrations, on a rather larger scale, of the four supporting figures at the angles, which form certainly not the least successful and interesting portion of the sculptor's work. They represent private soldiers of four of the arms of the service over which the great captain exercised rule.

On the work generally,—on the fine qualities of some portions of it, and what we venture to consider some defects in other respects, we have already commented, and need not repeat what has been before said. It may be as well to put on record here the main facts as to the carrying out of the work.

The bronze statue of Wellington and the angle supporting figures were designed and modelled by Mr. J. E. Boehm, R.A., and were cast by Mr. Moore, of Thames Ditton. Mr. Boehm was assisted in designing the pedestal by Mr. Howard Ince, an able young architect, who, some years ago, gained the travelling studentship of the Royal Academy; and that part of the work, which is of red Peterhead polished granite, was executed by Messrs. Macdonald, of Aberdeen.

The platform, pavements, and surrounding alterations were designed by and carried out under the superintendence of Mr. John Taylor, of H.M. Office of Works. The marble mosaic pavement was executed by Messrs. Burke & Co., of Newman-street; and the inlaid Aberdeen and Peterhead granite work, the Aberdeen granite steps and general works, by Messrs. Mowlem & Co., of Westminster.

The cost of the statue, angle figures, and pedestal has been about 10,000*l.*; and of the platform, pavement, and surrounding improvements about 5,000*l.*

PLANS OF ROMAN THERMÆ.

BY the kindness of Professor Aitchison we are now enabled to supplement the plans of the Baths of Caracalla, which we published a fortnight ago, with plans of other Roman Thermæ, which have been described in this year's Lectures in Architecture at the Royal Academy, as published in our pages during the last few weeks.

NEW CHURCH OF ST. EDMUND, SOUTHAMPTON.

THIS church is in course of erection in the Avenue adjoining the grounds of the Convent and School de la Sainte Union des Sacrés Cœurs, by the Rev. E. Rivara. It is of local red bricks, with dressings of Ham Hill stone, and Bath stone internally. The tower and convent chapel are not included in the present contract. The total cost when complete will be about 11,000*l.*, the site having been a gift. The architect is Mr. W. Lunn; the builder, Mr. W. H. Chapman, of Woolston.

JUBILEE MEMORIAL FOUNTAIN, KINGSTON-ON-THAMES.

ON the occasion of the Jubilee rejoicings in 1887 at Kingston-on-Thames, a sum of money was set aside for the erection of a permanent memorial of Her Majesty's Jubilee, and this, it was eventually decided, should take the form of a fountain, the execution of which was entrusted to Messrs. Doulton & Co., of Lambeth.

The fountain is constructed entirely in salt-glazed coloured stonework (Doulton-ware), and is a little over 17 ft. high, and 9 ft. 3 in. wide at the base, just above the three granite steps by which it is approached. The lower portion is divided into four sections by buttresses, at the foot of each of which is a dog-trough. Between the four large basins are perforated screens. Above each basin is a niche containing small panels, from which the drinking-water pours. In the semi-circular tops of the niches are ornamental medallions, surrounded and supported by perforated foliage. The medallion facing the road has the inscription:—

"Erected by public subscription, as a memorial
Of the Jubilee of her Majesty, Queen Victoria,
A.D. 1887. George C. Sherrard, Mayor;
Joseph Marsh, Chairman of Committee."

On the opposite side the shield bears the arms of the town of Kingston. On the sides between are portraits of the Queen. One bears the words

"Victoria, Dei Gratia, A.D. 1837."

and the other

"Victoria, Regina et Imperatrix, A.D. 1887."

Above the cornice of the square central portion rises an octagonal upper tier, which terminates in a dome and cupola. Mr. Arthur E. Pearce, designer to Messrs. Doulton & Co., made the design, and superintended the manufacture and erection of the fountain.

WORKS NEAR GODALMING.

THESE consist of restorations and additions to old buildings, in the case of Rake Mill House, Darbyn'sbrook, and Littleford, and new buildings in the other cases. The materials are Bargate stone or red brick in hollow walls, Burnetised Dantzic timber, filled in with concrete of silenitic lime, and weather tiles.

The builder for Rake stables was Mr. R. Pink, of Milford, and for the other works Mr. Harvey Brown, of Bramley, near Guildford.

The architect was Mr. Ralph Nevill, F.S.A., of London, and formerly of Guildford.

All the tile roofs are laid in concrete plaster, on Mr. Nevill's system.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE seventh ordinary meeting of the present session of this Institute was held on Monday evening last, Mr. Arthur Cates (Vice-President) in the chair.

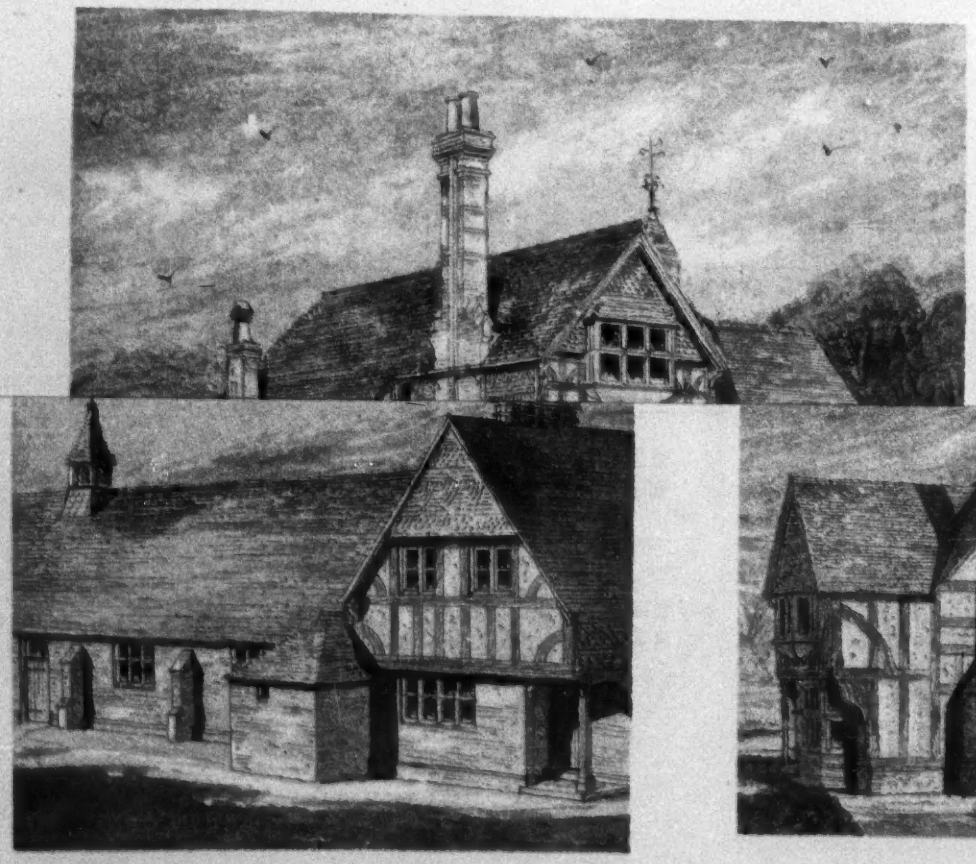
The New By-Laws.

The Chairman read the resolution of the Lords of her Majesty's Privy Council approving of the new By-Laws. The first matter for the consideration of the present Council, on receipt of that approval, was the proceedings to be taken under the temporary By-Law for the election of the new Council. The new By-Laws provided an entirely new constitution for the Institute, and a Council constituted very differently from the present one, with a different system of election. The temporary By-Law provided that the present Council should remain in office until the close of the first general meeting following the election of the new Council, which new Council should, in the manner provided by By-Law 31, be elected as soon as possible after the By-Laws had been approved by the Lords of the Privy Council. The usual general meeting in May was not so far distant, and the preliminary business which had to be accomplished before the executive would be in a position to send out the necessary information for the election rendered it undesirable that there should be any election immediately, although the By-Law provided for such. The Council of the Institute therefore proposed to adopt By-Law 30 as it stood, and having completed all the preliminary arrangements, to issue, two weeks prior to the annual meeting on May 6, a list of members nominated for election on the new Council, and then to proceed exactly as provided by By-Law 30. He presumed the members would agree with the Council that that was really the earliest period at which the temporary By-Law, with all reasonable despatch, could be complied with (applause). Under the new constitution, by By-Law 9, ballots for the election of members could only take place at business meetings. The ballot, therefore, would be deferred to the business meeting of March 11.

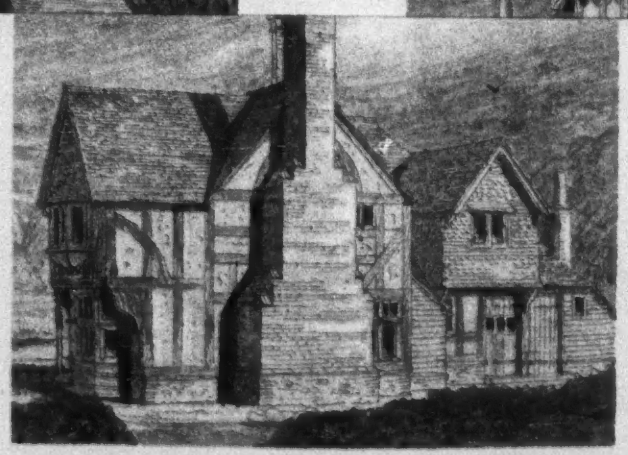
Specification Writing.

Mr. Thomas M. Rickman, F.S.A., then read a paper on "Writing a Specification," of which the following is an abstract:—The author began by stating that the specification was one of the means employed by the architect to carry his design into execution. The design was in his mind. The drawings presented a reproduction of the design in scale-projection; they were a representation of the idea in the architect's mind. The specification was the translation of the design into technical language, describing the selection of the materials and the construction of the whole. The duty of the writer of the specification was to translate the design, from all the materials at his disposal, into another language; from the image in the mind of an architect to a technical English description of the work. The true specification should be in course of preparation all the time that the design was being elaborated by the architect. The general description of materials should govern the details of construction; and the work of preparing each should be simultaneous. The writing of a specification should be encouraged as part of a pupil's work during his articles, rather than the common course of education, which left that part of the art altogether to those who had passed through their period of apprenticeship. It seemed in some cases as if the architect-master of the present day followed the discipline of Pythagoras, who, it was said, expected a probation of five years from his pupils, and afterwards instructed them in the meaning of the enigmatical sayings in which he involved much of his doctrine. Before writing a specification its purpose should be fully considered. Much might be said, as regarded the order of treatment adopted, in favour of each of the following courses, the varied influence of which might frequently be traced:—(1) Giving directions as to general principles, leaving the details to the common sense and experience of those who have to carry them out; (2) following the order of the quantities, and, in fact, only supplying a running commentary upon them; (3) following the order of the execution of the work; and (4) following the order in which the work would be taken when measured up. For the practice of specification-writing, perhaps the most important mental quality, after patience, was decision, and the author considered that before writing a specification the mind should be made up as to the meaning and application of the following terms, about which there were varying opinions. Uniformity in the use of words and the avoidance of varied terms meaning the same thing would also be of great assistance in making a specification intelligible. "*Allow for*" was a term which should not be used: it belonged to a bill of quantities, and should show that the extent of the work was at the risk of the contractor. "*Provide*" was intelligible, if applied to quantities of materials and labour; if applied to sums of money, a very clear interpretation clause was needed. "*Supply*," if used in place of the usual "provide and fix," increased the clearness of the specification, and avoided some prolixity. "*Proper*," before the introduction of work in imitation of Mediæval structures, had an intelligible meaning, as applied to ledged doors, door-frames, &c.; it was now safer to fully describe what was intended. "*Sufficient*" was a legal term which required breaking down so as to convey the intention of the writer; to describe the intention might save much trouble. "*Best*" had ceased to have any definite meaning through the introduction of the terms "Best Best," "Double Best," and the like. "*Prime cost*" required explanation as to whether it was to be taken from the list price without trade allowances, without also discount for cash, and also whether it had to be increased by establishment charges, carriage, or fixing. There were few occasions for the use of "*To fix*" which would not require some detail beyond the term. "*Average*" was a dangerous word, as it admitted of some of the work described being of less dimensions than were specified, and often nothing short of a measurement of the whole would clear up the doubts thrown on the execution of the work by foreman or clerk of works. "*Sizes*" should be explained as "out of," or "finished," and often at what time or in what position they were to be taken. Before "*Attendance*" was used the amount of labour and responsibility thrown on the contractor should be clearly explained, and the Employers' Liability Act should be understood; the delay occasioned by other tradesmen should also be considered. The application of the term "*Reinstate*" to dilapidations was not considered by the author; to require a contractor to reinstate after accident, or after defects other than those of his own materials and labour, demanded a specially drawn specification; and it was sometimes better for the immediate use of the building to leave a small defect than to cut the structure to pieces in order to insert new material in construction, if power were retained by the architect to charge for renewal, when an opportunity allowed of the work being executed. "*Local Requirements*" should be mastered before they were referred to in a specification. "*Watching and Lighting*" should be explained, whether for the contractor's own work or for other tradesmen, whether for night-work or for day only; the use of gas, firing, and special lighting varied in each case, and no general clause was in all cases sufficient. "*Search for Old Drains*"; some knowledge of where the old drains were was necessary before drawing the specification.

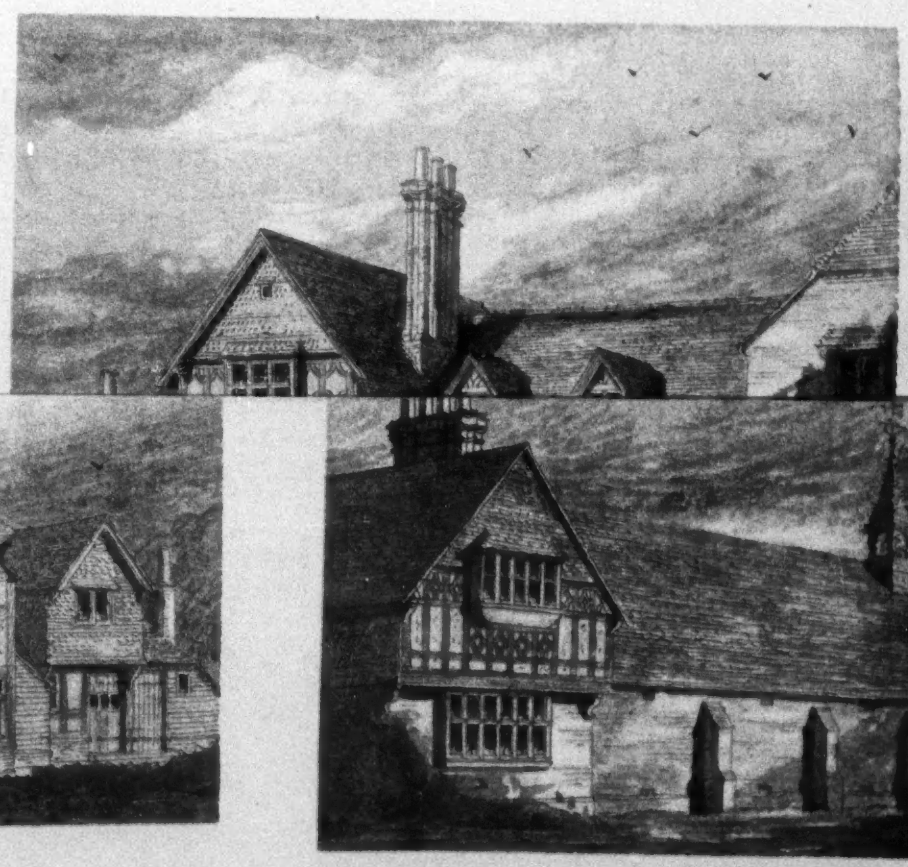
THE BUILDER, MARCH 2, 1889.



FARM STABLES.



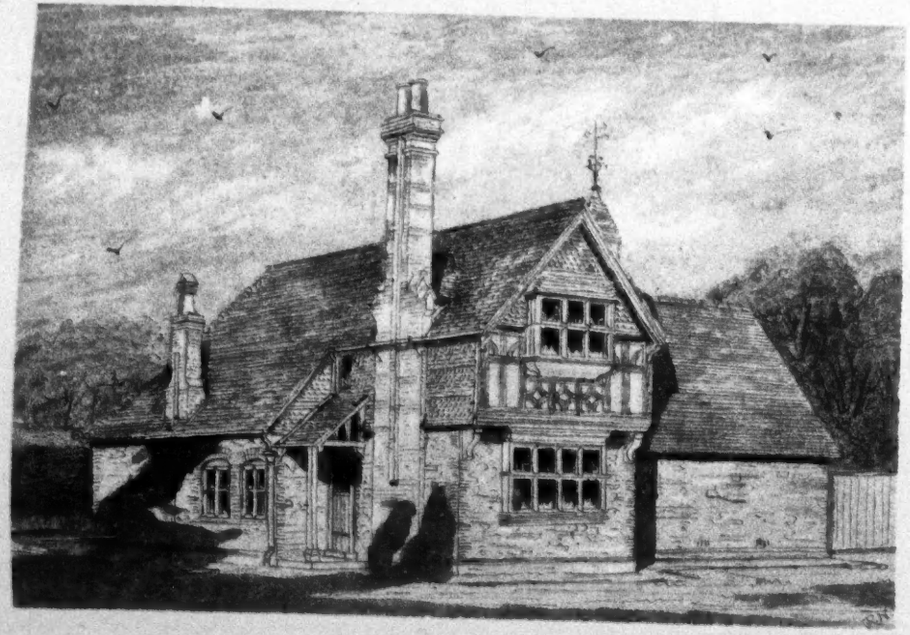
DARBYN'S BROOK.



FARM STABLES.

"IRIS PHOTO," SPRAGUE & CO. 22 SKINNER LANE, CANNON ST., LONDON, E.C.

WORKS NEAR GODALMING, SURREY.—Mr. Ralph Nevill, F.S.A., Architect.



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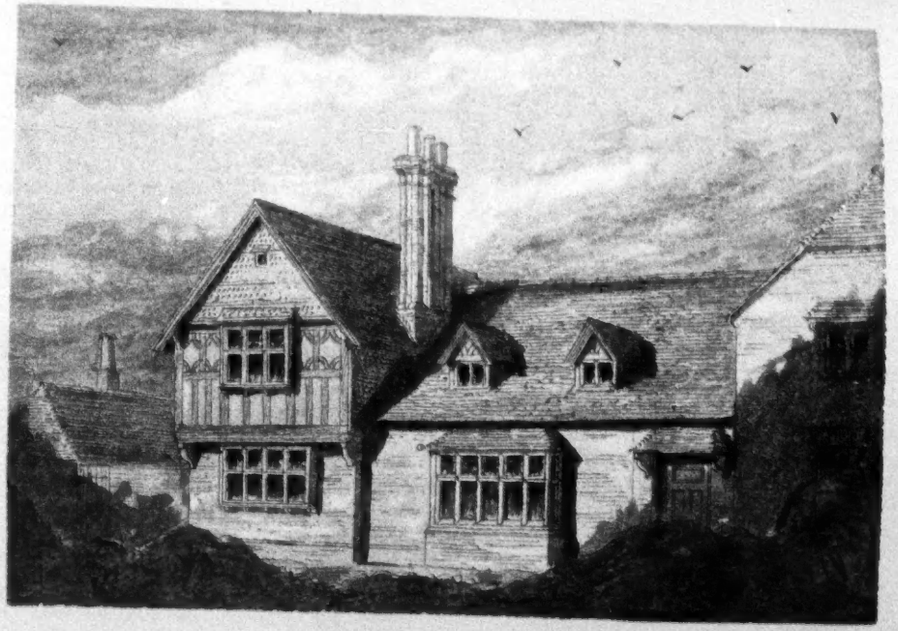
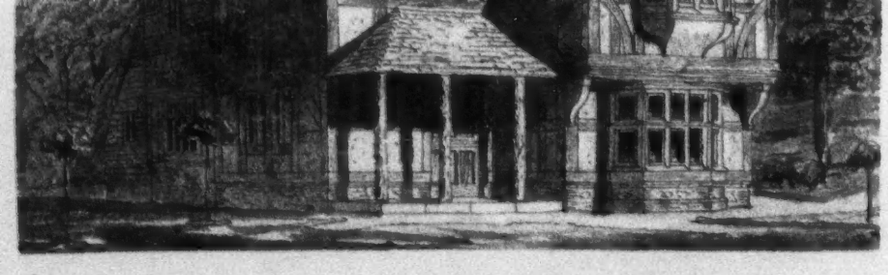


RAKE MILL HOUSE.



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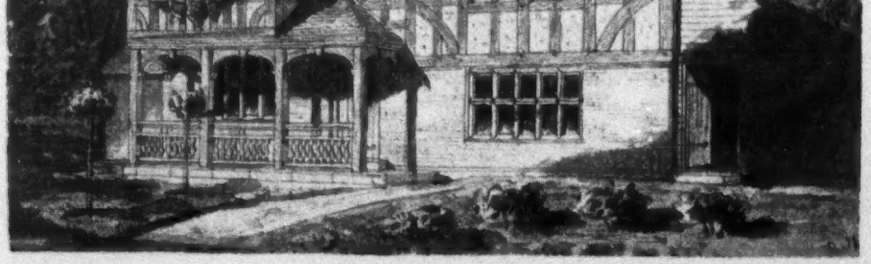
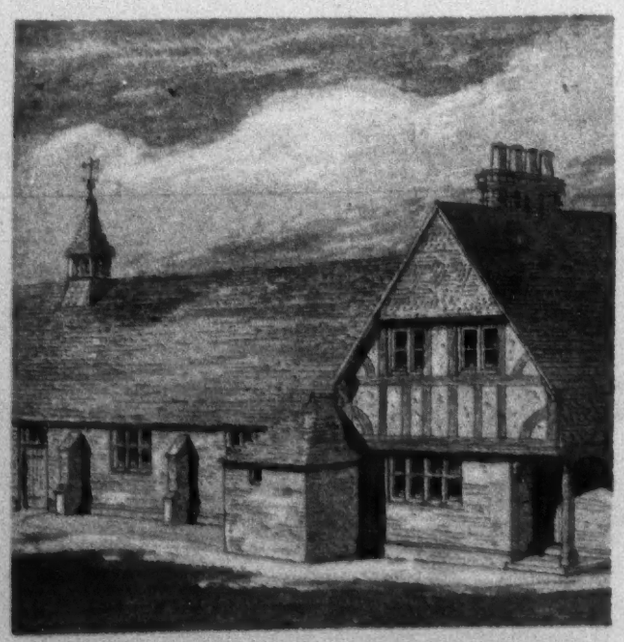


LITTLEFORD.



FARM STABLES.

DARBYN'S BROOK.

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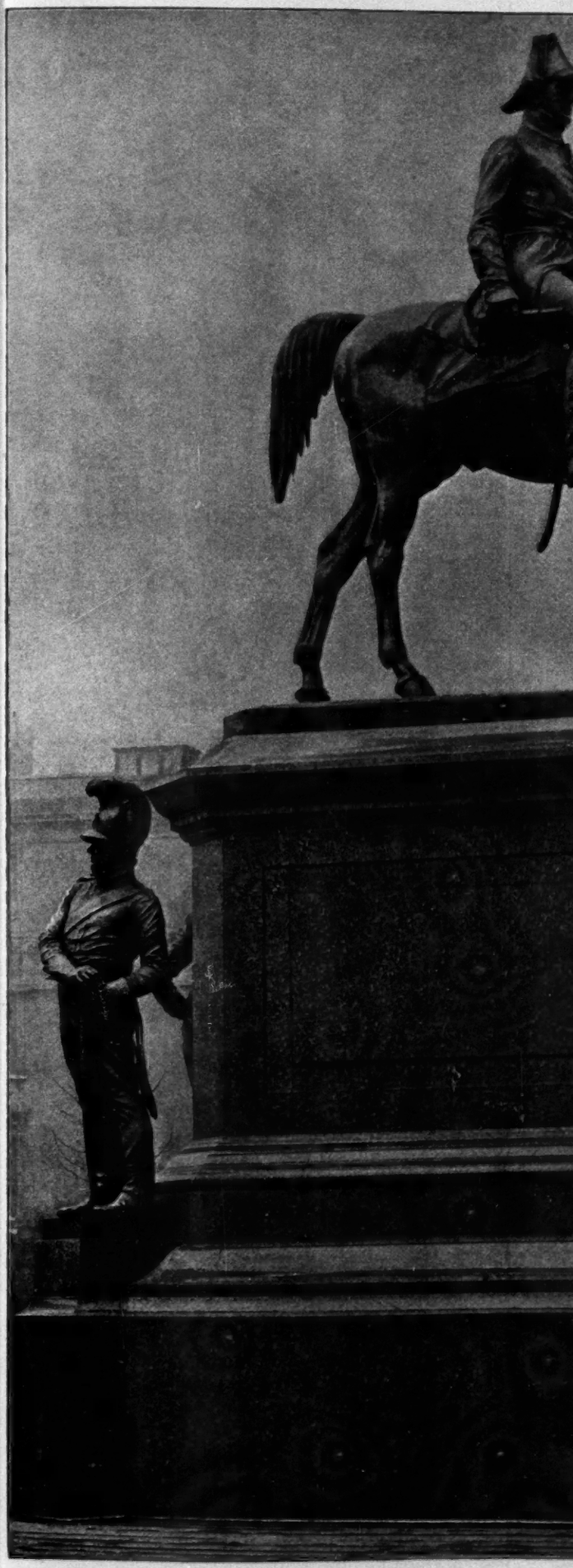
WORKS NEAR GODALMING, SURREY.—Mr. Ralph Nevill, F.S.A., Architect.

ANGLE FIGURES.



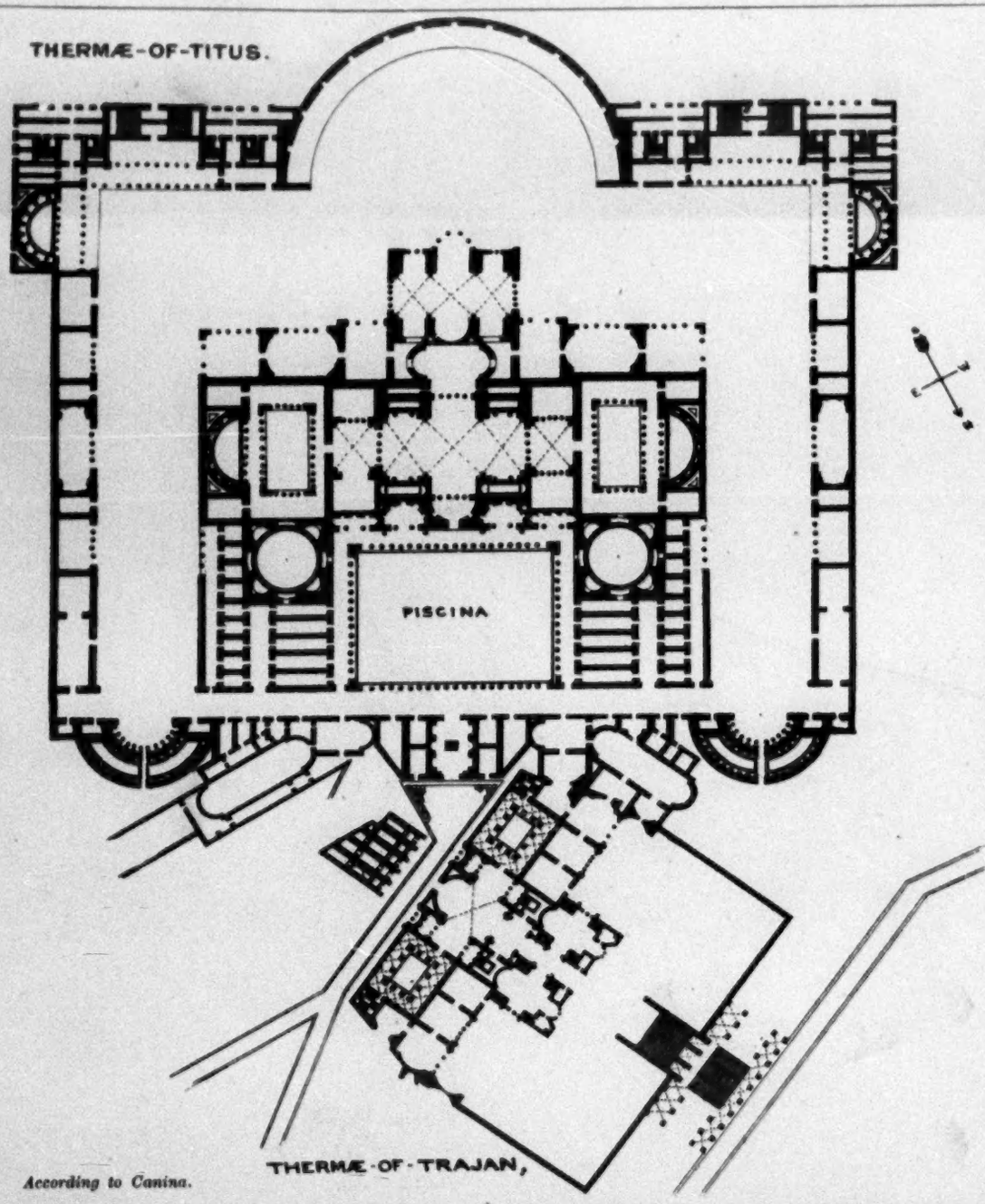
THE WELLINGTON MONUMENT, HYDE PARK CORN

ANGLE] FIGURES.

ORNER. MR. J. E. BOEHM, R.A., SCULPTOR.

The Phototype Co., 93, Strand, London.

THERMÆ-OF-TITUS.



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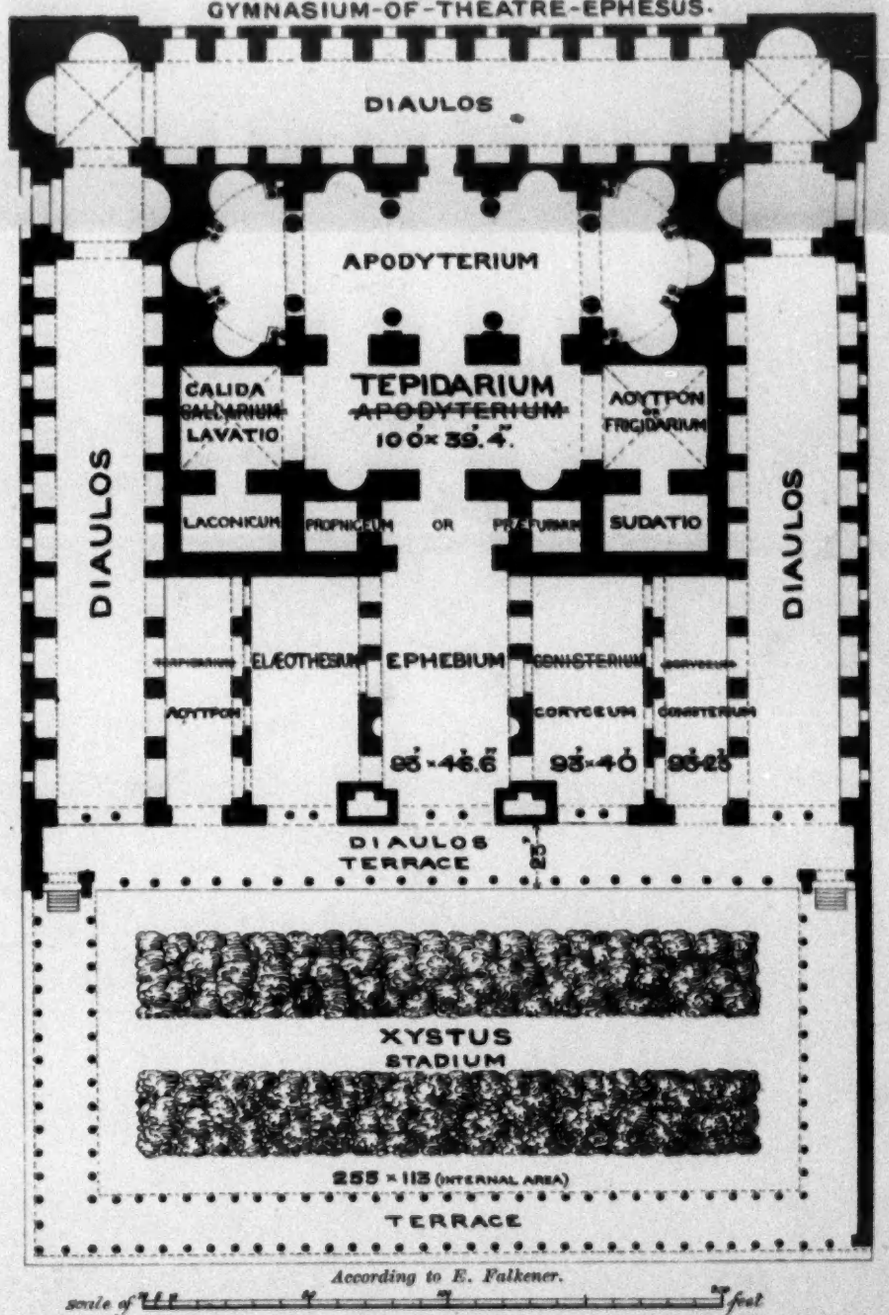
GYMNASIUM-OF-THEATRE-EPHESUS.



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scale of feet

PHOTO-LITHO. SPRAGUE & Co. 28, MARTINS LANE, CANNON ST. LONDON, E.C.

PLANS OF ROMAN THERMÆ.—IN ILLUSTRATION OF PROFESSOR AITCHISON'S ROYAL ACADEMY LECTURES.

PLANS OF ROMAN THERMÆ.—IN ILLUSTRATION OF PROFESSOR HOFFSTADT'S ESSAY.

NEW CHURCH OF ST EDMUND, SOUTHAMPTON.

Mr W. Lunn, *Architect*

Plan

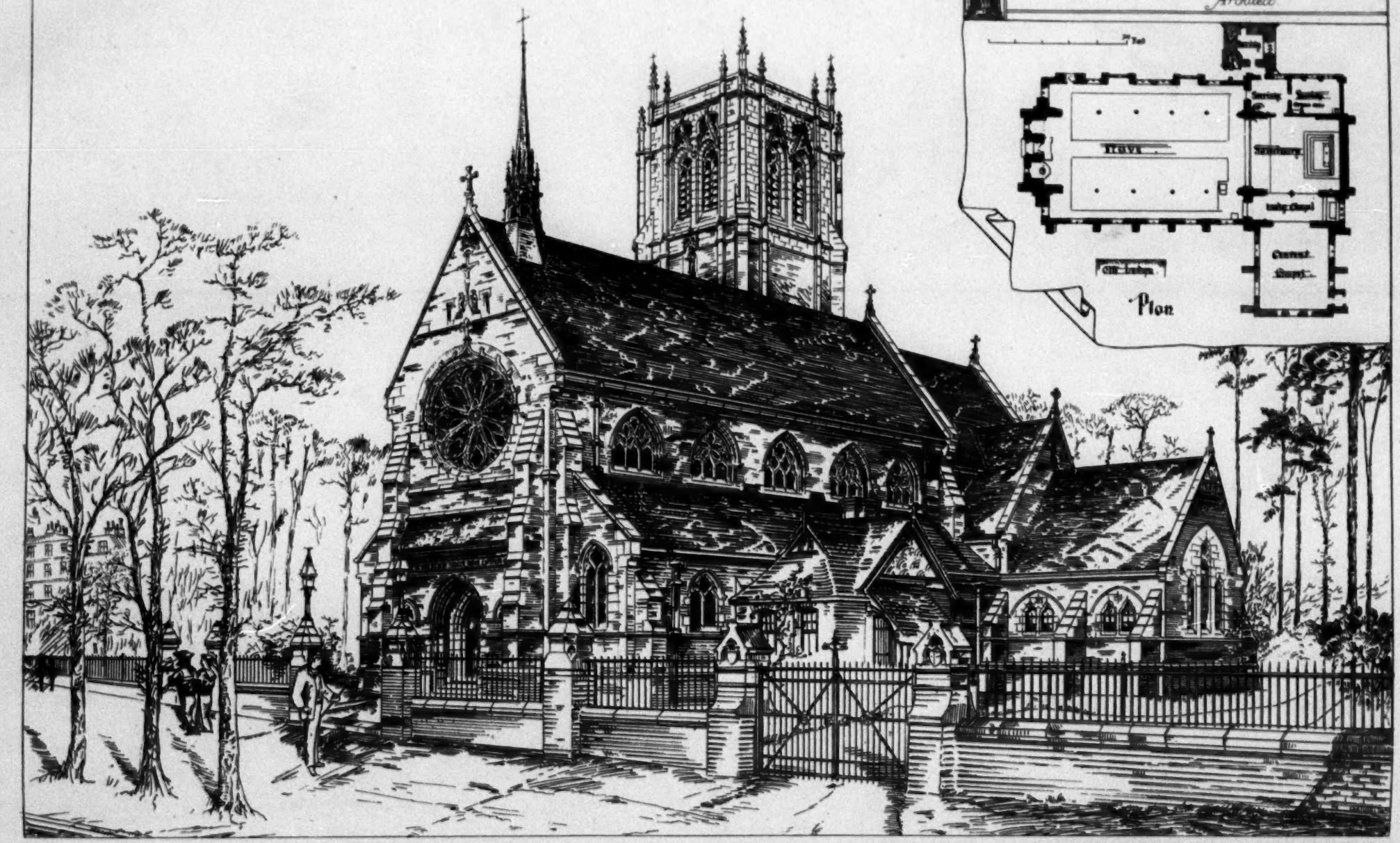
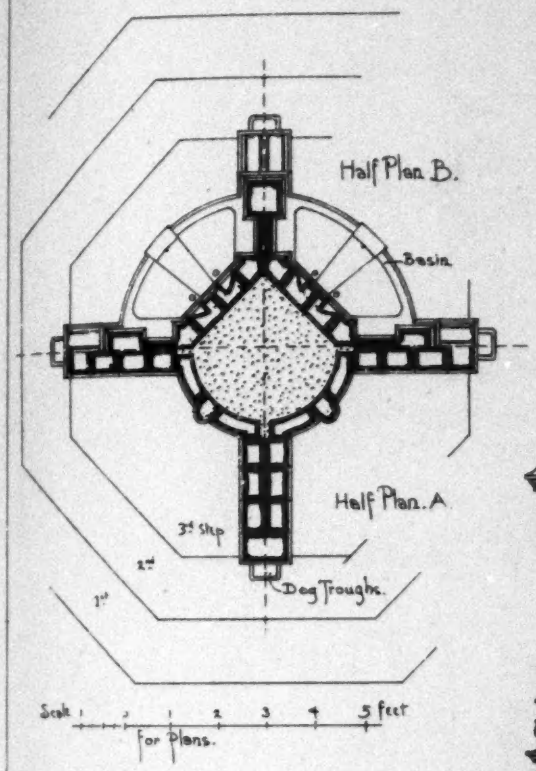
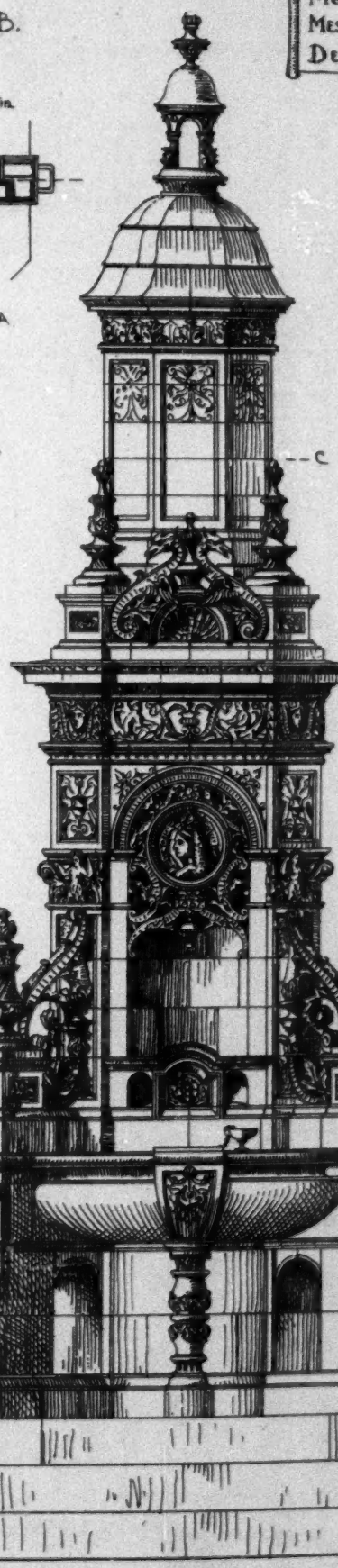


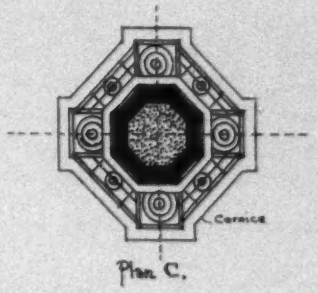
PHOTO-LITHO. SPRAGUE & Co 28, MARTINS LANE CANNON ST. LONDON, E.C.

Jubilee Fountain Kingston on Thames.

Made in Glazed Stoneware by Messrs Doulton & Co. Lambeth. from Designs by Arthur E. Pearce. 1888.







Plan C.

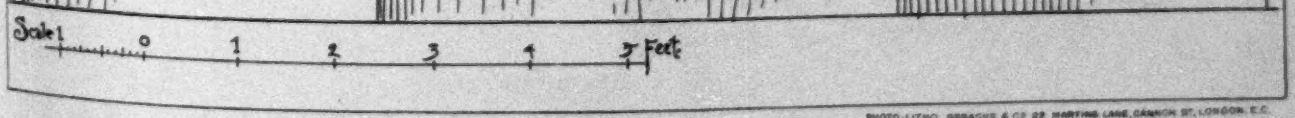
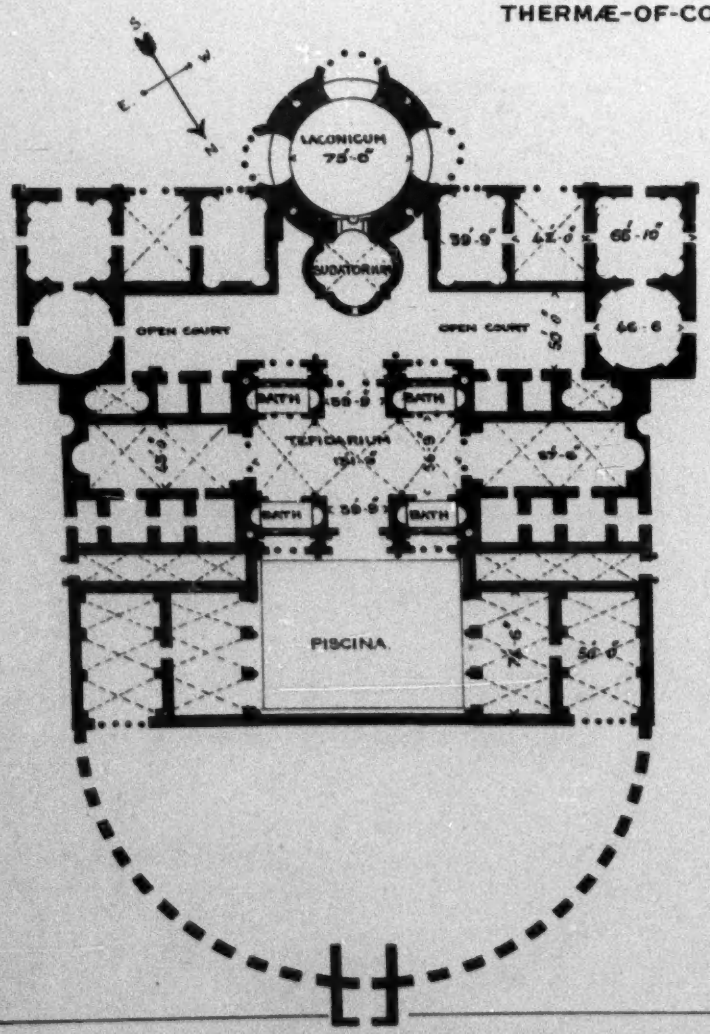


PHOTO-LITHO. SPRAGUE & CO. 62, MARTINS LANE, CANNON ST., LONDON, E.C.

THERMÆ-OF-CONSTANTINE.



THERMÆ-OF-AGRIPPA.

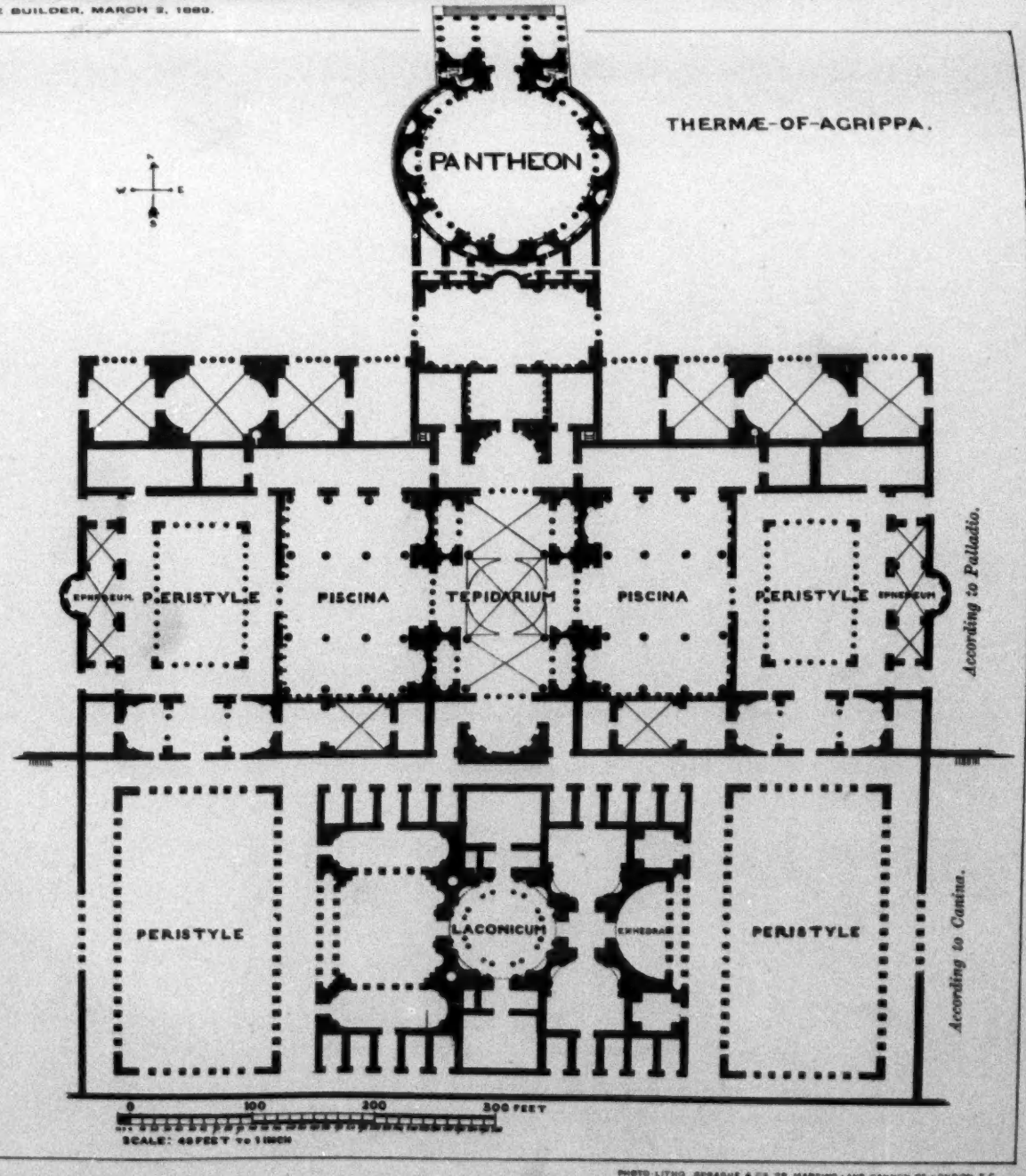


PHOTO-LITHO. SPRAGUE & Co 28, MARTINS LANE, CANNON ST., LONDON, E.C.

PLANS OF ROMAN THERMÆ.—IN ILLUSTRATION OF PROFESSOR AITCHISON'S ROYAL ACADEMY LECTURES.

"*Facilities*" were to be afforded for inspection of work and for the introduction of other tradesmen for fittings during the progress of the contract, and it was only fair to define beforehand the extent to which this was to be carried, and the accommodation and responsibilities involved. If "*Use of Scaffolding*" was required for special purposes, or to be specially erected, attention should be drawn to the subject, as otherwise the ordinary words might carry only the use of scaffolding erected for the contractor's purposes, the extent of which varied greatly in different localities. The precise mode to be adopted in "*Secret Fixing*" should be clearly studied before writing the description. Before describing "*Concrete*," it was well to make up the mind whether absorbent or non-absorbent materials were to be used, whether burnt ballast was to be allowed or not, whether lime and cement might be mixed together, and whether the material should be shot into trenches from a height and left untouched under a penalty, or whether it was to be carefully laid without dropping, and then well punned. Would the architect approve of "*Art Tiles*" if winding and out of shape? or would he insist on having as good workmanship in their manufacture, without seconds, as he would have expected from Hollins or from Maw? "*Rubbish* and *Débris*" were both dangerous terms, but occasionally used; they were supposed to mean brickbats: waste-paper and night-soil should be specified out of them. If by "*Asphalte*" tar and sand was meant, it should be stated; if superior material in two thicknesses, the maker's name should be clearly specified. For "*Flooring*," the mind should be made up as to widths of boards, thicknesses, whether from the saw, the mill, or the plane, mode of fixing, quality, finish, and bearing. In "*Ironmongery*," the sets of hinges and the mastership should be decided on, and if P.C.'s were given they should be continued throughout. The tests required for "*Cast*" and "*Wrought Iron*" should be resolved on, and who was to pay for the testing made clear, whether the material passed the tests or not; whether Belgian iron was to be used or rejected should be decided on, and the cost of special rolls remembered. The capacity of the ordinary bricks should be studied for "*Brick Facings*"; every special mould required would delay the building so many days; whether all bricks were to be firsts, or any percentage of seconds allowed, should be clearly stated; and, as regards pointing, whether the kind described was likely to last if executed with the brickwork ought to be ascertained. London and Manchester interpret the term "*Old English Bond*" differently; which was to be used should be determined and made clear, and in any bond it should be decided whether the perpends were really to be kept, and the necessary position of closers remembered. With reference to the term "*Trapped*," the gases of the present day got through obstacles which in old times had been intended to stop rats; the water supply forced traps formerly approved; and he considered decision as to the form of a trap the strongest proof of professional influence. The mind should be made up as to what "*Bonding* or *Cross-bonding*" gave the better bond between stone and brick; it should be remembered that the average lengths on the two faces of a quoin-stone multiplied together did not give the average section of the stone quoin; and in what cases jamb-stones should bond within the face of wood frames ought to be stated. "*Joggles*": doubt should be inadmissible as to whether the material mentioned was stone or cement, or as to the cases where the joggle ought not to be stopped. It should be decided whether "*Scarfings*" were to be described by a general rule or in detail; whether to be invariably bolted, and whether to be used at discretion. In "*Fixing Leadwork*," decision was necessary as to the use of bossed seams or wooden rolls and other details; in some cases a judicious reticence was safer than doubtful detail. As to "*Drain Pipes*," the new patent joints should be tried before being specified; the tests defined, whether candle, water, or peppermint; the sizes stated, and the writer of the specification should be sure as to the construction of the bottoms of the access chambers before binding the contractors as to the mode of execution, and also as to which side of a trap the fresh air was intended to be introduced. When "*Centreing*" was wished to be close-jointed, it should be stated. If the edges of "*Plate Glass*" were to be blacked, it should be noted. "*Custom of the Country*" should be studied with reference to stone facings, and the mode of pointing, slating, and tiling of all sorts, with bedding and torching appropriate. The selection of stones, and the appropriate treatment of each, was too large a subject for the author's present purpose. Among the many things likely to be forgotten might be mentioned:—The possible necessity of driving the planking of foundations; the application of a rule as to footings to piers and special cases; the liability to misinterpretation of the width of bed of a stone; the amount of labour carried by descriptions such as moulded, stopped, enriched, fitted, veneered, and the like; the accesses to cisterns, taps, and many other things; and the selection of sizes and shapes to suit the market for the several materials. The objects of a writer of specifications would be best gained if he first of all placed himself in the position of his client, but with his own better knowledge as to judicious expenditure; in the position of the builder, but with an art-knowledge which the builder might not have as to the materials available; and in the position of the clerk of works and foreman in having to obtain from the workmen intelligent labour.

The Chairman, at the close of the paper, said that with a good many architects the writing of specifications was thought to be a simple matter, and many, without years of experience, hardly appreciated the difficulty of expressing their meaning in terms which conveyed ideas clearly to those who wrote specifications from another point of view. He hoped there would be an animated discussion on the subject, because in days gone by there had been considerable difference of opinion between architects as to whether a specification should be treated in the elaborate manner which Mr. Rickman considered was the proper course. Some held that a general description of the qualities of the materials and workmanship, in rather vague terms sometimes, was the best way to deal with a specification, leaving the elaborate drawings, annotations, and descriptions to convey their meaning to the workmen. Even in that case there would arise a considerable difficulty in conveying the exact meaning to the workmen, and difficulties and omissions would continually arise. With the complete system advocated by Mr. Rickman those difficulties would be less likely to crop up, but the architect would have to be a many-sided man to be minutely acquainted with the details of every trade necessary to carry out his scheme. He would also probably receive great assistance from the draughtsman in his office, and from that now apparently indispensable adjunct to building works, the quantity surveyor, whose revision of the specification, after the process of taking out the quantities had been completed, would supply many minute details which the architect perhaps had overlooked. As to the necessity for patience, decision, and accuracy of language, there could be no doubt whatever. Of all things, the first qualification for an architect undoubtedly was patience (applause), after which, decision became an essential quality, one in which architects were sometimes wanting. Then, again, unless the architect had cultivated the habit of precision of language, which was intelligible in the sense in which it was meant, not only to himself but to those who read it, that decision would be of little value. Litigation in connexion with building matters arose frequently from looseness of expression. In that respect the paper was most important, as bringing home to architects, and those studying for the profession, the great importance of attaining that power of accurate expression by which alone they could avoid some of the pitfalls which had been indicated. Mr. Rickman's remarks upon "best" and "prime cost" were also of great value. Some years ago, when the term "best" began no longer to mean anything but the worst, it was an ordinary practice to introduce at the head of specifications a declaration to the effect that the word "best" was intended to be used in its real sense, and no such travesty of the English language as "best best" would be entertained. In the present day, too, when the practice of employing special tradesmen was so general, it became important that the manner in which these were dealt with should be clearly expressed. The architect should, therefore, thoroughly make up his mind as to what would be the ultimate result, and the result between himself, the contractors, and the builders (applause).

Mr. E. T. Hall drew attention to a feature which Mr. Rickman had not specially laid stress upon,—viz., the necessity which should be present in the architect's mind of making his specifications quite irrespective of the fact that quantities were to be taken out or not. If he set himself to work to do that, he would have a more perfect specification, and he would cultivate that which Mr. Rickman had laid stress upon,—namely, a habit of precision. If an architect did not know what he meant to do in the execution of a building, it was impossible that the clerk of works or the builder should know. Therefore, if he set to work and analysed the building from bottom to top, he would give the quantity surveyor less labour, and would possess himself of a knowledge of the building which the clerk of works and the builder's foreman could never have (applause). Mr. Rickman had drawn attention to the fact that specifications generally described what was to be done, and added that the suffering followed. The suffering here, however, was sometimes on the part of the client, and was usually followed by suffering on the part of the architect. Mr. Rickman had said that the writing of specifications should be encouraged as part of an architect's education, but he (the speaker) thought it could hardly be part of the pupil's work, as it required great experience, though the pupil might learn how to do it by being set to copy specifications, than which there could be no better education. With regard to loose expressions in specifications, of course there could be no justification whatever for them, leading as they always did to trouble, and being in every way most objectionable. As to details, Mr. Rickman objected to the expression "Allow for" as a phrase which was indefinite, but there were in reality certain items which came under that description. Referring to the terms "best best" and "double best," these must have originated from a desire to assist the builder in evading the common-sense meaning of the term "best." The young architect who did not know all those particular terms ought not therefore to be made to suffer. As to the vexed question of "prime cost," he hoped that the Institute before long might see its way to have a definition of the term, which would prevent the trouble which had arisen. "Prime cost" should have but one meaning, namely, the first cost which the builder paid for the articles specified, and if it were clearly laid down that "prime cost" applied to the actual cost which the builder paid out of his own pocket, no injustice would be done to any one. With respect to the architect's knowledge of the Employers' Liability Act, he did not quite follow Mr. Rickman that that was an essential, because it was one of the responsibilities which the builder, in making his estimate, should contemplate. A common expression in specifications was that timber should be absolutely without sap, but in the case of timber for joists it was almost impossible that that should be so. Indeed, a trifling piece of sap on the edge of a joist had no materially prejudicial effect on the building, and it was simply reasonable that such a thing should be passed; but it was unreasonable that a clause should be inserted in the specification to the effect that no particle of sap should be in the timber. Watching and lighting in regard to the contractor could only apply to the work he had undertaken under the contract. As to searching for old drains, if they knew exactly where they were they would not use the expression "searching" for them (laughter). The architect should specify what he meant with regard to the term "asphalte." If he meant tar and sand he should say so. The best thing to do with regard to drain-pipes was to specify that they should be tested. When the pipes were laid the outlet should be blocked, and they should be filled with a charge of water, and if there was any flaw in the line of pipes, even as small as a pin-hole, the pressure would soon find it out, while if the drain stood that test they might be sure it was strong enough for all the work it would have to do. Mr. Hall concluded by proposing a hearty vote of thanks to Mr. Rickman for his very able paper (applause).

Professor T. Roger Smith said he thought the meeting had perhaps gone a little from the nature of specifications to the nature of the things which should be specified, while Mr. Rickman had tried to turn their thoughts to the somewhat difficult question of grasping exactly what a specification should be by telling them some of the qualities which went to the making

of it. At the same time, there were one or two matters Mr. Rickman had laid little stress upon. He had mentioned properly that a man should have patience and decision, but he (the speaker) was inclined to think it was equally important that he should have knowledge (laughter and applause). Unless a man knew thoroughly what materials the tradesmen would furnish him with; what would be expensive and what would be inefficient; what would be necessary for his purpose, and form the general scheme, he would be very much at sea when he came to write his specification. A man who was going to write a specification must furnish himself with knowledge, and he would even then find he had to get a good deal of special information for the preparation of individual specifications. Another essential quality was system. A man should, as far as possible, proceed on the same lines. He believed that a good, and, in many respects, valid specification, might be written comparatively short, describing things in somewhat general terms, but in that case it must not in any way go into particulars. On the other hand, if a man went into particulars, he ought to go equally into particulars in every part of his specification (applause). And he should lay down a system for himself, and adhere to it. Years ago, when special trades were done by various tradesmen, the object of the specification was to give each tradesman a description of that part of the work which fell to himself. Afterwards, however, came the very convenient mode of having one contractor to do every kind of work, and the specifications were then made into one volume. The curious thing was that they were going back to the old plan, and the chairman had pointed out that specifications existed even in which one-half of the contract-money was introduced in the shape of money provisions; which was simply going back to the individual tradesman. It looked as if they felt, to a certain extent, that they had gone a little too far, and that they were now getting more of the work done by separate tradesmen than was the custom a few years ago. The sole reason, almost, why it was desirable to include the various tradesmen, by the help of many provisions under one contract and specification, was to get the supervision and control over them that the general contractor exercised. When they came to look at so large a portion of the work being practically done without descriptions, the question arose whether they really wanted the descriptions in the specification, as directions for working, or for something else. If they were going to carry out work without a contract, whatever the specification practically said it was almost useless, and, if that were so, it was a point worth looking carefully at. It showed that they ought to have the question of the contract in their minds in writing specifications from beginning to end (applause). They ought to be such documents as would compel the contractor to carry them out in every way, and if so, the next thing that followed was that the nearer they ran to the quantities the better, because in all the work quantities were practically the basis from which the contractor formed the idea of what he would have to do. That seemed to show that those gentlemen who got the assistance of quantity surveyors, at any rate, to improve their specifications were not altogether unwise. The speaker concluded by seconding the vote of thanks, and by complimenting Mr. Rickman on the literary value he gave to subjects which in other hands would be comparatively prosaic, if not tedious (applause).

Mr. William White said that in former times it was a practice for contracts to be taken by different tradesmen, simply because the locality was often such as not to justify the existence at that time of a builder. That system might have its advantages, each man being interested in the work he had to do, and doing it personally. At the same time, there must be, in the present day, one responsible head for the whole of the work, in order to avoid the many disputes that would inevitably ensue. The architect ought to draw the specification for the surveyor as well as the contractor, instead of the surveyor drawing the specification for the architect (applause); and the surveyor detecting some little omissions which might have taken place in the description of the specifications, it was his privilege and duty to draw attention to them, and not simply to pass them over and let them go. He certainly thought there ought to be one first basis in writing a specification.

Mr. Lacy W. Ridge said the question as to the definition of "prime cost" was certainly a difficult one. There were great advantages in these days in employing men who devoted their time specially to one particular branch of building, in such matters as fire-proof floors, lifts, or other things which required a good deal of special experience. Therefore, they should not draw out general conditions, and in the provisions they made they should be prepared to provide for them. As to the searching for drains, if the architect could not search for them before he drew his contract, how could the builder know what allowance should be made (applause)? Therefore, such a thing as searching for drains should be followed by a provision for money. He did not understand Professor Smith's idea of writing a specification in general terms, and where the object was to make a contract he did not see how the specification could be anything but full (applause). He agreed with Professor Smith's remark that knowledge was, after all, about as important a quality as could be brought to bear upon the work. Honestly, it was the architect's duty to know what he meant, and to say it in his specification (applause).

Mr. Henry Lovegrove expressed his admiration at the concise form in which the paper had been put together. He considered that if a rough general specification was supplied by the architect to the surveyor, the latter had a great inducement to follow the order of his quantities. It enabled him to compare the specification with the bills, and make them check each other. He agreed that the term "allow for" should not appear in a specification. The word "provide" should be used in the quantities, and it was better to give the number, weight, or quantity. It was quite certain the word "supply" would always meet the case. He agreed also that the word "fix" did not adequately represent what the architect meant. As to the term "prime cost," it seemed the one thing in the specification on which the architect and builder could never agree when the time for settling came. "Prime cost" should mean the money actually paid to the merchants by the builder, and his profit of 10 or 15 per cent. could be added to the amount. There was no doubt that in the rush and hurry of modern practice sufficient time was not given to the drawing up of specifications, and it was not a work which was practised by the ordinary architect.

Mr. W. H. Atkin Berry said that, as a young architect, he had experienced the greatest difficulty in dealing with the matter of "prime cost." Builders had architects very much in their power, and he hoped to hear some distinct expression of opinion on the subject. He was glad to hear it distinctly recognised that the specification was still to be regarded as the work of the architect, and not of the surveyor; for it had become the custom with many to look upon it as work to be delegated to the surveyor. The architect, he considered, should have as much control over his specification as over his drawings.

Professor Aitchison said he believed that most architects who knew their business could write a good specification, provided they had the time, but even when it was done in the best way, it appeared to him the architect generally was insufficiently paid for it (applause). The builder was naturally anxious to get as much out of it as he could, and the architect was the only person who probably gave away the larger portion of his time for nothing.

Mr. William Woodward contended that a specification should be drawn in such a way that, supposing the architect died, or the work was taken out of his hands, it, with the drawings, would be sufficient to enable the entire carrying out of the work on the original lines.

The vote of thanks was then put to the meeting and very heartily received.

Mr. Rickman, in his reply, said that the discussion had shown there were points in his paper which it would be well for them to study before they wrote a specification. Some of the speakers had suggested that the term "best" should be sufficient, but many architects did not mean to have the *best* things. The term "best" had sometimes a curious technical meaning, as in the case of glass, where it meant that it might have been selected four or five times. As to the general question of provisions, he had not gone into it on that occasion, as he did not consider it possible to compress what should be said on the subject into a paragraph in a paper on specifications. He understood, however, that the subject was to be discussed at the Institute of Builders in the course of a few days,* and it would be well if some architects were able to be present, and to take part in the discussion, so that they might understand the views of the builders in reference to the enormous number of provisions frequently brought into specifications. The one real difficulty in dealing with provisional sums was the payment through the contractor, and the client would often find it better to pay for many things direct than to pay for them through the hand of the contractor, who would necessarily pass the plane over them (laughter). He did not believe that a pupil who had been under five years in an office would be able to write a satisfactory specification. Professor Smith had said that the paper did not recommend knowledge; but the first requisite he had propounded was curiosity, by which he meant that desire to find out all about the different things which would enable one to get the necessary knowledge to write out a specification. The right way, of course, to draw up a specification was to assume that the architect, surveyor, and builder were all acting honestly (applause).

The Chairman announced that the next meeting would be held on March 11, when a special business meeting would take place for the election of the Royal Gold Medallist for 1889, followed by a business meeting to ballot for new members, &c.

The proceedings then terminated.

THE ENGLISH RENAISSANCE.†

ST. PAUL'S is, of course, Wren's *magnum opus*. The present fabric was the outcome of several proposals, and the insistance of the clergy that he should adopt what was called the "Cathedral form." His first design was, as we know, more in the form of a Greek than a Latin cross, and the model of this is still preserved in the cathedral. This, however, and a modification, proving unsatisfactory to those concerned, he finally, as the compiler of the "Parentalia" quaintly puts it, "turned his thoughts to a cathedral form," by which, I presume, is meant the old Mediæval model, but so altered as to reconcile, as near as possible, the Gothic to a "better manner of architecture." King Charles approved the design on May 1, 1675, and the first stone was laid on June 21 following, Wren being at that time in the forty-third year of his age. In ten years the walls of the choir and side aisles and the circular porticoes were finished, and the piers of the dome were also brought up to the same height. The first service was held in the new cathedral in 1698,—twenty-three years after its foundation. The top stone of the lantern was laid by his son Christopher in 1710. Thus, in the comparatively short space of thirty-five years, the building was practically completed under the superintendence of one architect, by one principal mason, Mr. Strong, and during the occupation of the See by one Bishop of London, Dr. Henry Compton,—a wonderful contrast to the number of Popes, architects, and builders engaged in the completion of St. Peter's.

St. Paul's cost, in round numbers, about £750,000, was paid for principally out of the coal and wine dues, supplemented by voluntary contributions, and its architect was paid a salary of £200 a year. Allowing forty years for the time he was engaged on the work, this would give him £8,000, a little over one per cent. on the outlay; a truly magnificent remuneration for such services! It is interesting to compare St. Paul's with the contemporary church of the Invalides, the dome of which was begun by Jules Mansard in 1680, five years after St. Paul's, and finished in 1706, four years before the completion of the lantern of St. Paul's. The dome of the Invalides is 92 ft. in diameter, as against 108 ft., and is carried on four great arches, as against eight in St. Paul's; but internally it is lower in proportion to its diameter than St. Paul's, and in this respect probably better. Externally, the portico is two orders in the height, but there the resemblance to the English example ends, as neither in majesty of effect nor in dignity of style can the French church be at all compared to it.

I need not attempt to give you a description of the building itself. It is too well known to require this. In plan it is very pretty to look

* See notice in our list of "Meetings" on p. 174 of this week's *Builder*.

† Continuation of a Paper read by Mr. J. M. Brydon, F.R.I.B.A., before the Architectural Association on the 15th ult. (See p. 147, *ante*.)

at; but everything has been sacrificed to the "Cathedral form." For a domed church, the nave is too long and too narrow; the dome being so far off, its full effect is partly lost till one is close upon it. The breaking of the frieze and the architrave of the great order, to secure height for the nave arcade, and the introduction of an attic above it, seem to be grave errors. Then, again, to preserve an uninterrupted view down each aisle,—which is hardly ever seen,—the great piers of the dome are thinned down to the utmost; and the attempt to make all the eight arches look equal by mitreing the archivolts only results in making them look weak.

The dome itself is too high for its width. The most satisfactory view, to my thinking, is across the transepts, and the finest bay of the nave that between the Morning Chapel and the Wellington Chapel. Notwithstanding all this, the whole interior is full of charming design. The lines are everywhere soft, flowing, and graceful, while the detail is always refined and elegant; the carving exquisite and full of spirit. The sweep of the dome above the whispering-gallery is truly magnificent, and even the four arches into the aisles are, in themselves, most picturesque bits of design. We see what an immense advance in regard to workmanship the style had made since the days of Jones,—the workmen had learned to interpret the letter as well as the spirit of the architect's intentions, and the national characteristics of the style had become even more distinctly marked.

Externally, St. Paul's must more successful. The cupola rises from the body of the church in great majesty. The simple unbroken sweep of the peristyle on its plain base, from which the eye is easily carried down to the ground, secures for it a repose that is beyond all praise; indeed, we may claim that for dignity and elegance it has no rival anywhere, and especially is it far and away superior in this respect to St. Peter's. Again, however, it must be admitted that the employment of two orders, one over the other, resulting in two porticoes in the height in the west front, with one pediment doing duty for both, is most unsatisfactory, whilst it will never cease to be matter for regret that Wren did not boldly grapple with the problem of nave and aisles and clearstory, with the flying buttresses to support the nave vault, instead of erecting screen walls to hide the whole construction. Perhaps the exterior gained in simplicity by the treatment he has adopted, though one cannot but feel it is more or less of a sham, and that a great opportunity was thrown away. On the other hand, granted the two orders, nothing could be happier than the two western towers, considered either by themselves or in the general grouping with the dome and the rest of the church; from whatever point of view we take it, the effect is admirable, the most successful exterior of any Renaissance church in the world.

The mechanical skill and ingenuity displayed in its construction, and especially of the cupola, are in every respect most admirable, and worthy of the earnest study of every student. It is often said that Wren was a much greater engineer than architect; in his time there was no distinction, and in him we see a man who could construct scientifically and design artistically simply because he understood his work and how to express it.*

Besides St. Paul's, Wren built some fifty churches after the fire. Let me only mention two or three. St. Stephen's, Walbrook, is famous for its interior,—which for its size is unsurpassed by any other church in Europe. It is a simple parallelogram, 82 ft. long by 59 ft. wide, with sixteen Corinthian columns so spaced as to produce the effect of a nave and aisles, with a central area covered by a dome 45 ft. in diameter. Out of such simple elements, Wren has obtained one of his greatest successes in an interior full of elegance, admirable in proportion, and picturesque to a degree rarely ever found. I am sorry to add that this beautiful church has recently been "restored," internally, almost out of all knowledge.

Another fine interior is St. James, Piccadilly, famous also for the skilful carpentry of its roof. It is not much larger than St. Stephen's, being 86 ft. long by 67 ft. wide. It is divided into nave and aisles by a row of four columns on each side, the nave being covered with a barrel vault, and each bay of the aisles with side vaults opening out of it at right angles. Again out of these simple elements a most charming and elegant interior is produced, much marred, however, by a hideous east window. This is a galleried church, and the galleries are skilfully worked into the construction, being supported by square piers, on which stand the columns carrying the vaults. The pity is that all this beauty should be enclosed in such an unworthy shell.

No notice of Wren's contributions to English Classic must forget his steeples. The steeple is a peculiarly national feature of this style, and Wren may be said to have invented it. His towers everywhere give a character to the City, and they are designed with rare skill for their sites. Witness that of Bow Church,—the finest of them all,—how well it stands on the ground, how picturesquely it groups from every point of view, especially up and down narrow Cheapside, though it is a thousand pities the loggia he designed for the street front of the church was never carried out. Old Bow Church, of historic and Dick Whittington memory, was generally regarded as the principal parish church in the City. It stood back from the street, and on the old site the present church is built. In order to get the steeple out to the line of the houses, a private house was purchased, and on this site the steeple is built. It may be interesting to know that in digging for the foundations an old Roman causeway was found 18 ft. below the surface. On this Wren built his tower, so that this bit of English Renaissance really stands on a Roman foundation. Another interesting historical incident anent St. Mary-le-Bow. In old Mediæval days there were tilts in Cheapside, and the king was wont to sit in a gallery near the church and watch them. When Wren built his steeple, to commemorate the old days of tilting and the Royal gallery, he placed a doorway with a little railed balcony overlooking Cheapside.

Bow Church was finished in 1677, and its great rival, St. Bride's, in 1680. It must be confessed Wren's later steeple is not equal to St. Mary's, at least in the spire part, which has somewhat the appearance of a drawn-out telescope. The monotony of the stages lacks the grace of form and play of light and shade of the Cheapside example. The interior, however, of St. Bride's is much finer than the other, which is commonplace to a degree. St. Bride's is another galleried church with a barrel-vaulted nave, though quite different in every respect from St. James, Piccadilly. Of a different type is the tower of St. Magnus, London Bridge, said to have been finished as late as 1705.

Besides his church work, Wren was employed on many large civil buildings. He followed Jones as architect for Greenwich Hospital. He built extensively both at Oxford and Cambridge, the Sheldonian Theatre at the former and Trinity College Library at the latter being among his best-known examples; also several of the City Halls.

He designed and carried out the extensive additions to Hampton Court Palace under William and Mary, including the Fountain Court, and what are known as the State Rooms. The garden front has a stately picturesqueness about it which is thoroughly English,—the simple quiet of its treatment and the homeliness of its material, red brick with stone dressings, amid the setting of its lovely garden, famous for its turf, combine to render it the beau-ideal of a Royal suburban retreat,—to my thinking much more interesting than the corresponding palace of the French kings at Versailles.

The seventeenth century was now drawing to a close, though Wren had still plenty of good work in him yet. His patron, Charles II., died in February, 1685, and was succeeded by James II., who in three years' time succumbed to the Revolution of 1688 and the advent of Mary and her Dutch husband, William,—afterwards William III., who reigned till the accession of Queen Anne, in 1702. It had been a wonderful century; the country had made immense advances in all that makes for the greatness of a nation. It was no longer a question of England and Scotland, but of Great Britain,—though the actual union by Act of Parliament did not take place till 1707, under Queen Anne. The East India Company had been incorporated, and made great progress in the formation of what ultimately became our Empire in the East. England's Colonial Empire had been founded by the settlements in the Carolinas and the New England States,—the beginning of that Greater Britain which has come to be such a factor in the civilisation of the world. The party names of Whig and Tory came into use to distinguish the opposing Parliamentary factions. Our well-known English Bible had been translated and published as the authorised version. In Literature we have the immortals Milton, and Bunyan, and Dryden; in Science the mighty Newton, and Harvey, and Flamstead, the founding of the Royal Society and the Royal Observatory at Greenwich; in industries the establishment of the celebrated Spitalfields silk-weaving; and everywhere an enlarged and increasing commerce. Wars we had also in plenty, finishing with Marlborough's brilliant campaigns in Queen Anne's time, and the establishment of England's military prestige. Through sixty years of it all, Wren worked away at his architecture, now under one monarch, now under another. If he had his enemies, who were ready to prate against him on occasion, he had also his honours. He had been knighted by Charles II., he was M.A. of Oxford, and D.C.L. of both universities. He had been Professor of Astronomy and President of the Royal Society, and had sat in two Parliaments.

Wren, unlike Jones, never visited Italy to study the great works of the Italian Renaissance. Doubtless, had he done so, he would have gained greatly in artistic power. On the other hand, the loss of such an experience probably made him more self-reliant, led him to think out matters for himself, and, consequently, to originality of expression, and by that means may,—more than we are at first inclined to allow,—have helped forward that distinctive national character which pervades the English phase of the style. Wren was Jones's successor in the office of Surveyor-General of Public Works, from which, at the advanced age of eighty-six, and after fifty years of faithful service, he was dismissed in favour of a Court favourite, at the instance of a Court intrigue, to the everlasting disgrace of George I. and his ministers. He died in February, 1723, at the age of ninety-one, and was buried under the south aisle of his great cathedral. With the death of Wren may be said to have closed the Early English Renaissance, which had lasted about one hundred years. It had now become firmly established as the national style,—the vernacular of the country. With the advent of Vanburgh and Hawksmoor and Gibbs begins the later Renaissance. The reign of Queen Anne,—whose name has been taken so much in vain in the recent revival,—was the age of transition; an age also of great palaces, such as Blenheim and Castle Howard, and Grimsthorpe in Lincolnshire; and, notable for the development of the typical English plan of a great central block with curved wings or curved colonnades connecting it with side wings at their extremities, so as to form a great semicircular forecourt,—a type revived, by the way, by Messrs. Deane & Son in their competition design for the Imperial Institute.*

The style up to the end of the seventeenth century was characterised by great vigour and picturesqueness, and by a freedom from restraint and an honesty of purpose not always to be found in the later Classic. The mouldings were well drawn and full of expression; not merely an arrangement of lines put together anyhow, as is too often the case with our latter-day Queen Anneists. A great school of carving had also been created, at the head of which stands the honoured name of Grinling Gibbons. Here, again, as in the case of the mouldings, there was great expression of purpose and vigour of execution, combined with a richness and grace which never degenerated into trivialities and meaningless scrolls.

I am fortunate this evening in having the use of Mr. Joseph Pennell's wonderful drawings of the old City Halls, built during the last half of the seventeenth century. An examination of them, particularly of the Brewers' and the Skinners' and the Girdlers' Halls, will show you better than any words of mine the character of the work I am so anxious to insist on. Look at the breadth of treatment, the power of drawing, and, above all, the picturesqueness, obtained often in the simplest and most natural manner. There is no straining after effect for effect's sake. Yet all this is as thoroughly English work as the best of our Gothic. Such Classic as this could never be found anywhere but in England. It would be as impossible to mistake this for French or Italian as to mistake Salisbury for Amiens, or Westminster for Notre

* Is not this opinion rather at variance with the fact, just before noted, that Wren did *not* express the real flying-buttress construction, but ignored it in the external design?—ED.

* Illustrated in the *Builder* for July 16, 1887.

Dame; and it is as distinctively national as the best work of any time in our country. Indeed, though some of its features and detail may be of foreign descent, just as our Norman and Early English Gothic, still under native hands they became so much acclimatised as to seem almost indigenous. Time will only permit me to mention a few instances of detail. The so-called Venetian window, a composition of three lights said to have been invented by Scamozzi, but which is so uncommon in Venice and so much the reverse in England as would almost lead the student to suppose that the former had imported it from the latter, where it is used in a dozen different varieties, and always with good effect. Then in doorways, what I may call the beautiful "shell-headed" type, of which we have so many charming examples, especially in woodwork. In details, what is known as the Ionic order may in this country be called the English Ionic. The treatment of the capital, with its wide-spreading volutes, used with or without the necking, and the little swags from volute to volute, flourishes here in its greatest luxuriance. In like manner also what is known as the Composite capital received a special development in England.

In the interior finishings and fittings of rooms, plaster and woodwork, but especially the latter, holds a prominent place. Panelling and staircases were everywhere important features. Look again, at the old City Halls and Ashburnham House; nowhere can you find such work as that out of England, or in it, of more thoroughly national character; the development of the same spirit in brickwork came later on. We must recognise that we are here in the presence of an English Classical style as truly the embodiment of the civilisation and the life of the people as any Gothic that ever existed,—a living, working, architectural reality, as much a part of England as its literature or its great school of painting, which it is as impossible to ignore as it was folly to forget,—the nearest to us in time and in similitude of requirements, a great mine of artistic wealth open to all who have eyes to see, hearts to appreciate, and understanding to apply to the necessities of our day.

I have taken up so much of your time with the rise and progress of the style during its great age, the seventeenth century, that I have little left in which to do justice to the later Classic of the eighteenth. I must ask you, therefore, to merely let me point out that, as in Italy, and in the case of our own Gothic, it somewhat declined from the high ideal of its more vigorous manhood; not that many excellent buildings, artistically considered, were not erected during the later period, but they as often as not lacked the purity and elegance of their predecessors. For instance, there came in with Gibbs and others what one might call the portico stage,—in which no building was thought to be complete without a portico, which, however beautiful in itself, was often sadly misapplied. There were something like 200 manor-houses erected in England,—many of them of vast size,—during the eighteenth century, one-half at least with porticoes. Porticoes also were often used in conjunction with features for which they had little sympathy; for example, Jones or Wren would never have been guilty of the incongruity of sticking a tower and spire on the top of a portico, as Gibbs has done at St. Martin's Church, and James at St. George's, Hanover-square. Even Hawksmoor knew better than that; when he built St. George's, Bloomsbury, he boldly put his tower to one side. Had Gibbs only done this at St. Martin's, say at the angle nearest Trafalgar-square, so as to carry the lines down to and stand firmly on the ground, this otherwise beautiful steeple might have been a formidable rival to that of Bow Church itself. Gibbs was more a slave to the orders. St. Martin's lacks height, especially internally,—all hampered by the order employed. Its low elliptical ceiling and vaulted aisles cannot for a moment compare with the similar treatment in St. James's, Piccadilly. Gibbs also built St. Mary-le-Strand, with its charming circular portico; though the tower is not so interesting as St. Martin's, it is better managed as far as its position goes. This is the church so much threatened of late. Its removal would be an irreparable loss to the picturesqueness of the Strand. Threatened men, they say, live long. Let us hope the proverb applies also to churches, and that this fine work may be long preserved to us. Gibbs was employed both at Cambridge and Oxford. At the latter he built the well-known Radcliffe Library, between the years 1737 and 1747. The dome, 50 ft. in diameter, forms one of the principal features in all views of Oxford, materially enhancing the artistic effect of the scene. In itself the building is possessed of considerable merit, and looks more like the work of the Wren school than any of its contemporaries.

Gibbs also designed and built the Hospital of St. Bartholomew, and before I leave him let me pay a tribute to his honour in recording the fact that he did all this work at the great hospital as honorary architect, giving his services for the benefit of the charity. Any one who has gone through its vast wards, with their splendid staircases, and inspected the great room and the offices, and noticed the care with which it is all carried out, will admit that his generosity was only too amply bestowed.

Besides those I have mentioned, the other great names of the eighteenth century, which I can do little more than allude to, are Kent, who built the Horse Guards and the old Board of Trade offices; Dance, the architect of the Mansion House and Newgate; the brothers Adam, who introduced almost a style of their own, characterised by great delicacy in its ornament and general thinness and weakness of its Classical details. Lastly, the foremost architect of the latter half of the century, Sir William Chambers, the architect of Somerset House, and the author of the well-known "Treatise on the Decorative Part of Civil Architecture," in which he did for the literature of the English Renaissance what Vignola and Palladio had done for that of Italy. Of his great work at Somerset House I am unable to say anything to-night. It is well known as the work of an artist and a scholar, and one of the finest of our public buildings.

Sir William Chambers was one of the founders of the Royal Academy, instituted in 1768. He was its first treasurer, and Sir Joshua Reynolds its first President, and its first exhibition at Somerset House opened on May 1, 1780.

The mention of the Academy reminds me of a distinguished amateur of the eighteenth century, Richard Boyle, Earl of Burlington. He and his architect, Campbell, designed Burlington House, now the home of the Academy. On the screen you will find drawings showing what it was before the advent of that august body, and of the beautiful colonnade taken down to make room for the various quarters of the learned societies between it and Piccadilly. Alas! that the housing of all this art and science should have been accomplished at the sacrifice of so much that was beautiful in architecture, the mother of them all. Burlington House itself, one of the most refined and beautiful examples of English Classic, has been simply ruined by the addition of an extra story out of all proportion and sympathy with the old work below it, and by a dreadful half arcade, half verandah, in front; while the splendid colonnade still lies going to wreck and ruin on the banks of the Thames at Battersea, a prey to every spoiler who chooses to heave half a brick at it,—and this for the accommodation and advancement of an Academy of *Arts!* Truly, the force of irony can no further go. It is simply a disgrace, and, I was about to add, could have happened nowhere but in England, till I remember that the Parisians burned down entirely their beautiful Hôtel de Ville.

Lord Burlington's name reminds me of a story of another eighteenth-century building, and of how things were done then, with which I must draw my occupation of your time to a close. When the City Fathers resolved in Common Council to build a new Mansion House for the Lord Mayor, a committee was appointed for conducting the business, consisting of the Lord Mayor, six Aldermen, and twelve Common Councillors, and many architectural designs were offered for their choice,—in fact, a kind of informal competition. Lord Burlington, zealous in the cause of the arts, sent down an original design of Palladio, worthy of its author, for their approbation and adoption. The first question in court was not whether this plan was proper, but whether this same Palladio was a freeman of the City or no. On this, great debates ensued, and it is hard to say how it might have gone had not a worthy deputy risen up and observed gravely that it was of little consequence to discuss the point, when it was notorious that Palladio was a Papist, and, of course, incapable. Lord Burlington's proposal was then rejected *nem. con.*, and the plan of a freeman and a shipwright, and above all a Protestant, named Dance, adopted in its room. The result was the present Mansion House, the chief corner-stone of which was laid with much ceremony, and in the presence of the said Civic Committee, on October 25, 1739.

[For a report of the discussion which followed the reading of the paper, see *Builder*, p. 149, *ante*.]

ARCHITECTURAL SOCIETIES.

Sheffield Society of Architects and Surveyors.—At a meeting of this society, held in the School of Art on Tuesday evening, a paper was read by Mr. W. C. Fenton, entitled "Notes on Practical Sanitary Construction." Mr. Flockton presided, and there was a good attendance of members. The subject of the lecture was divided into two parts,—first, the sanitary construction of the dwelling; and second, the accessories for the proper cleansing and conveyance of the waste products of the dwelling and dweller. Mr. Fenton remarked on the great progress in sanitation during the last twenty or thirty years. The various Acts of Parliament relating to public health, culminating in the great Act of 1875, and the efforts of such eminent sanitarians as Sir R. Rawlinson, K.C.B., and Mr. E. Chadwick, C.B. (now in his ninetieth year), were referred to, and their influence shown. On the other hand, the diversity of legislative and administrative regulations was adversely criticised, and examples given where in one town strict sanitary regulations were enforced and in the next neglected, owing chiefly to the one town having local Acts of Parliament and the next mainly relying on the general Act, which did not give sufficient powers. Turning to the dwelling, the lecturer urged that greater attention should be given to the site with regard to the subsoil water, which had so great an effect on the health of the inhabitant, and instances were given which bore upon the importance of the question. The necessity for using only the best materials was strongly insisted on, and the proper quality and strength of bricks and stone were specified. The lecturer exhibited a table of tests taken of bricks made by different local manufacturers, which showed that while some bricks would only stand an average crushing strain of 19 tons, others would stand 56 tons, and one brick actually stood 67 tons before crushing. The greater use of hollow walls was recommended, both for dryness and the more equable temperature of the house. The importance of sufficient light for health was insisted on, and the necessary amount discussed. In the second part of his subject the lecturer referred to the mode of sewage disposal as involved in the question of water-closets and privies. The proper position, construction, and ventilation of water-closets were shown, and the best forms of apparatus described. The other sanitary fittings of the house, with the various forms of "traps" and "wastes," were alluded to, and instances given of bad arrangements to be found even in "good" houses. The lecture was illustrated by diagrams, showing good and other methods of drainage, &c., and by samples of sanitary earthenware fittings lent by Mr. J. B. Corrie and Messrs. T. Wragg & Sons.

Edinburgh Architectural Association.—The usual fortnightly meeting of this Association was held on the 21st inst., when a paper was read by Mr. W. D. McKay, R.S.A., on "The Rise of the Fine Arts in Scotland." In conclusion, the lecturer gave it as his opinion that Scottish art had never been in a healthier condition than during the last thirty years.——On Saturday last the members had their second excursion for the present session, visiting Lauriston Castle, Cramond Tower, and Barnton policies. The members were conducted by Mr. Thomas Ross, architect, Edinburgh. Lauriston Castle, which was first visited, has been greatly altered in modern times, but copies of pencil drawings by Claud Nattes were exhibited by Mr. Ross, showing the castle as it existed in 1799, and these show it to have been a quaint old Scottish house, with angle turrets and fine dormers, all of which still survive, but hemmed in with modern additions. On one of the dormer windows can be seen the initials of Archibald Napier, of Merchiston, and his wife, Dame Elizabeth Mowbray. They built the castle between the years 1587 and 1608. After an inspection of the castle and grounds, the party next proceeded to Cramond, to the remarkable tower there—all that now remains of what was once the palace of the Bishops of Dunkeld, who possessed the lands known as "Bishops" Karramond, as early as the twelfth century. The tower is a small structure about 24 ft.

square, and as it at present exists about 40 ft. high. It bears a considerable resemblance to the towers at Mugdock Castle. At the termination of the day's proceedings a hearty vote of thanks was accorded to the lecturer and to the proprietors of the places visited.

BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

THE twenty-second annual general meeting of the donors and subscribers of this Institution took place on Monday evening last, at the offices, 21, New Bridge-street, E.C. The chair was occupied by the President, Mr. John Aird, M.P., supported by the retiring President (Mr. J. W. Hobbs, J.P.); Mr. E. Brooks, Treasurer; Messrs. E. C. Roe, E. B. Gammon, W. D. Gilbert, J. A. Robson, C. K. Turpin, B. C. Fox, G. C. Kentish, C. Brown, and other gentlemen.

Mr. H. J. Wheatley, the Secretary, read the report, which stated that the income for the past year had amounted to 680*l.* 17s., and consisted of 308*l.* 12s. in annual subscriptions, 276*l.* 15s. in donations, and 95*l.* 10s. in dividends. The expenditure was 460*l.* 1s. 11d. (359*l.* 13s. 4d. being for pensions and temporary relief). Two elections had been held, the result being that Mrs. L. A. Styles and Mrs. E. Shaw had been added to the pension-list. The number of pensioners now on the books is eighteen, and there are three children being educated and properly cared for at the Orphan Working School, per presentation of the Institution. The tenth annual dinner took place at the Holborn Restaurant on March 20, 1888, Mr. J. W. Hobbs, the President, in the chair, and, in answer to his spirited appeal, a sum of over 300*l.* was announced in aid of the funds. During the year Mr. Edward Conder (acting Trustee) and Mr. Arthur Cates, retired from the trusteeship, the Committee warmly thanking them for their twenty one years' service as Trustees. In consequence of these resignations, and of the death of Mr. B. Colls some years since, three new Trustees had been elected, viz., Messrs. J. Howard Colls, Thos. F. Rider, and Wm. Robt. Freeman (Messrs. Mowlem & Co.). The following gentlemen, elected as Trustees at the foundation in 1866, still kindly retain office, viz., Messrs. Geo. Samuel Pritchard, W. C. Anderson, and Charles Richardson. The Committee express their thanks to the hon. solicitors (Messrs. Paterson & Sons) for having prepared the necessary legal documents consequent on the changes in the trusteeship referred to. During the year a further sum of 300*l.* had been invested, bringing up the total of invested funds to 3,350*l.* To Mr. Hobbs, on his retirement from the presidency, the Committee return their best thanks, especially as he so willingly served them when he had many urgent calls upon his time as Mayor of Croydon. The Committee, in conclusion, express the feeling that the present state of the Institution must be a source of gratification to all concerned. To Mr. Thos. Peto Ward, the founder (to whose unwearied exertions the very successful start made was greatly due); to the long succession of gentlemen who year by year have served as Presidents, and to the donors and subscribers generally, the Committee tender their cordial thanks, and trustfully hope that the charity may ever prove a useful one to those who may need the assistance it affords.

The Chairman, in moving the adoption of the report, said that on this the first occasion of his presiding he must congratulate the Institution upon the care with which everything had been conducted, and upon the fact that so much benefit had resulted to those who unfortunately needed assistance. Great economy had been exercised in the working arrangements, and he was glad to find that after doing much good the Institution had yet been able to add to its capital during the past year. He did not think it needful to say more on the excellency of its management, but he hoped, at the Dinner, to follow the good example set by those who had gone before him, and to endeavour by all means in his power so to advocate the claims of the Institution, with a view to strengthen its funds, as to enable the committee to continue the good work it had before it. To assist in this would be a great source of pleasure to him, and he took it as a compliment to have been asked to assist in any way in helping forward so good a charity (applause). Mr. Aird concluded by moving the first resolution, viz., that the report, &c., be adopted, and printed with the list of subscribers and rules of the Institution.

Mr. E. B. Gammon seconded the motion, which was carried unanimously.

Mr. E. C. Roe then moved a vote of thanks to the retiring officers. Mr. A. Stanger seconded, and it was also carried unanimously.

The new officers were then elected, and a vote of thanks to the Chairman closed the proceedings.

Lectures at Carpenters' Hall.—A report of Professor Baldwin Brown's lecture on "English Furniture of the Eighteenth Century" is in type, but crowded out this week.

THE PROVIDENT INSTITUTION OF BUILDERS' FOREMEN AND CLERKS OF WORKS:

ANNUAL DINNER.

THE annual dinner of this excellent and old-established Institution was held at the Holborn Restaurant on Saturday last, when 335 members and friends of the Institution sat down to table. Mr. Samuel Knight, F.R.I.B.A., was in the chair, supported by Mr. Alexander Ritchie (of the firm of Steven Bros. & Co.), Mr. J. P. Strudwick, Mr. H. P. Monckton, and several other visitors. The usual loyal and patriotic toasts having been proposed from the chair (Mr. T. W. Heath suitably responding for "The Army Navy, and Reserve Forces"),

The Chairman proposed the toast of the evening, "The Provident Institution of Builders' Foremen and Clerks of Works." He said he was in entire sympathy with the Builders' Foremen and Clerks of Works Institution. He had been in the active pursuit of his profession as an architect for the last twenty-five years, and during that time had been intimately connected with builders' foremen and clerks of works, and he considered that architects generally were largely indebted to them for their assistance. As regards the Institution itself, it was, he believed, the oldest of its kind, having been established in the year 1842, and was thus in the forty-seventh year of its existence. The object of the Institution was to provide a fund for the assistance of men who were rendered unfit for work through ill-health or old age, and also to widows of members. A large amount had been paid as grants to members of the Institution during the years it had been in operation, the total expenditure being something like 7,000*l.*, and considering the small number of members, the result was very laudable and praiseworthy. He called attention to the fact that there was over 5,000*l.* invested in the funds; but he could not give the members of the Institution entire praise, for although there were more than 300 persons present that evening, there were only seventy-two subscribing members. He expressed a hope that many of those present would decide to join the Institution, and that before another year had passed the number of subscribing members would be doubled. It was perfectly idle to suppose that seventy-two members was anything like a representation of the number of members who ought to belong to their Institution—(hear, hear)—and he wished them to remember that in doubling their numbers they would be doubling their funds. The funds of the Institution were administered in a most economical manner, and he called attention to clause 17 of the rules and regulations, which showed the modest scale of remuneration to the officers. In conclusion, he mentioned that 332*l.* 3s. had been expended in grants and pensions during the past year (applause). The toast, which was received with acclamation, was coupled with the name of the Secretary, Mr. J. W. H. Bedford, who in response said that one of the reasons why their number was small was that a man must be over forty-five years of age before he could belong to the Institution.

The next toast was "The Governor and Trustees," which was proposed by Mr. J. Merifield, who spoke in high terms of the Governor (Mr. George Plucknett, J.P.).

Mr. Bedford replied on behalf of the Governor and Trustees. It was only ill-health that prevented the Governor being present that evening. Mr. F. J. Dove and Mr. Scrivener (two of the Trustees) were also unable to be present.

Mr. E. Groome humorously proposed the toast of "The Donors and Honorary Subscribers," and remarked that theirs was the only benevolent institution of its kind. The toast was coupled with the name of Mr. R. Adams, who responded.

Mr. Alexander Ritchie next gave "The Architects and Surveyors." He said they were in no small degree indebted to architects for the magnificent buildings which had been erected both in London and the country. The toast, which was well received, was coupled with the names of Mr. H. Percy Monckton and Mr. J. P. Strudwick.

Mr. Monckton, in replying on behalf of the architects, said they could not work without the assistance of the manufacturers, nor without the builders' foremen and clerks of works. Nothing could be done alone in this world, and his experience was that builders' foremen and clerks of works had always endeavoured to please architects, and had the same spirit in their work as the architects had in theirs.

Mr. Strudwick replied for the surveyors. He said the definition of the difference between an architect and surveyor would take too long to explain, but in one word the architect was an art man, and the surveyor a man of figures and dry, matter-of-fact information.

The Chairman next proposed the toast of "The Builders." Much had been said about the merits of clerks of works and builders' foremen, but by no means was it to be supposed that they could carry out the architect's design without the builder. No one was more sensible of the eminent assistance which was rendered by the builders to the architects in carrying out their works than he was. All the resource and energy requisite to carry out the architect's designs was supplied by the builders, and without them, many of the buildings referred to by Mr. Ritchie would never have been erected. The first duty of the architect was planning and construction; from that the superstructure was raised, which could not be done without the aid of the builder. In conclusion, the Chairman referred in eulogistical terms to the firm of Messrs. Mowlem, Burt, & Co., and the toast was coupled with the name of Mr. George Burt, who, in responding, said that he should like to see the builders' foremen and clerks of works themselves more strongly represented on the list of supporters of the Institution. Mr. Crickmay next proposed "The Press," associated with the name of the representative of the *Builder*, who responded; and Mr. J. Stapleton gave "The Visitors," coupled with the name of Mr. J. Aldcroft, Messrs. Chubb & Sons' representative.

Mr. Bennett next gave "The Chairman," who, in reply, said he wished to impress upon them that architecture was the chief of all arts and sciences, for it had to provide the structures wherein all other arts were housed. All workmen ought to take an interest in the building they were engaged upon, and ought to be taken more into the confidence by the architect, which, he was sorry to say, was not the case.

Mr. Carpenter (Clerk of Works to the Bank of England) proposed "The Officers of the Institution," and Mr. G. Ross replied. The total amount of subscriptions received during the evening amounted to upwards of 37*l.*

CASES UNDER THE METROPOLITAN BUILDING ACT:

NEGLECT TO GIVE NOTICE TO DISTRICT SURVEYOR.

MR. H. ROFFEY, a builder, was summoned by Mr. T. W. Willis, District Surveyor of Putney and Roehampton, at the Wandsworth Police Court, on the 13th ult., before Mr. Curtis Bennett, under the 37th Section of the Building Act, for not giving notice to the District Surveyor two days before commencement of the erection of a building; and further, for erecting a building with other than incombustible materials.

Mr. Reeve appeared for the District Surveyor, the builder being represented by counsel.

After a long argument, in which counsel contended that, the building in question, being so constructed as to be easily removable, and intended for temporary purposes, the District Surveyor was not entitled to notice, the magistrate decided in favour of the District Surveyor, and imposed a penalty of 5*l.*; together with 1*l.* 3s. costs.

In the second summons the District Surveyor stated that the building in question was intended to be used as a billiard-room. It measured 24 ft. by 18 ft., and was constructed with wooden framing, boarded inside and out, the roof being covered with felt. It appeared that the District Surveyor gave notice for the removal of the structure, or, as an alternative, its construction in accordance with the provisions of the Building Act. The owner, Mr. Walter Emden, refused to allow the builder to comply with the notice, but stated that he was willing to coat the woodwork with "Igultuge" paint. The magistrate decided in favour of the District Surveyor, but consented to the adjournment of the case for one month, to give the owner an opportunity of making application to the Metropolitan Board of Works for the retention of the building.

THE WOOD-WORK OF HADDON HALL.

SIR,—The historic account of Haddon Hall published in your issue of January 12, illustrated as it was by a series of admirable sketches, deserves the gratitude of all lovers of the Old England of which it treats. No more interesting series of sketches has yet been added to the many published drawings and paintings of Haddon Hall. Every portion of that stately mansion has its share in your description,—notably the long southern gallery, or "ball-room," which overlooks the terraced garden.

The wood-work of this beautiful room is one of the finest examples of the Elizabethan, or mixed, style which prevailed from the middle of the sixteenth century to the days of Inigo Jones, the counterpart of that spirited carved panelling, with pilasters, inlaid with fillets of ebony or stained pear-wood cornices, heraldic devices, and pierced overings, which distinguished the Flemish wood-work of that age, specimens of which, in the shape of press fronts, dressers, and other details, found their way down the canals of the Low Countries from Bruges, Malines, and other towns, into this country, to be completed by local carvers and carpenters.

The panelling of this long room is of oak, as that species of timber was abundant in former days on most estates in England. The whole surface has been, at some period, washed over with a light distemper coat, once probably white, now ash grey, over which the workman has laid a sort of graining of foxy red, now faded. This graining is not done by ingenious combings, wipings-out of veins, &c., in the modern manner. It has been dashed on by a rapid stroke of a broad washing-brush, spread out with the fingers, beginning from the bottom of the panel, carried up to the top round, and down again.

At first sight one might suppose it to have represented sweet cedar, then a rare wood. It differs from the more careful solid painting in oil, with pickings-out of gold, which decorates the panels of some other rooms in the house, and has every appearance of a rapid freshening-up for some festive occasion,—a marriage, coming-of-age, birth of an heir, or the like.

The hue of the entire panelling of the gallery is faded now. On a general survey it resembles old oak, dry, powdery,—like the surfaces of church-chests, granary corn-bins, church roofs, &c. It is to be noted that the timber roofs and panels of halls in which constant fires have burned, and from which smoke has escaped down wide, windy chimneys, have grown not grey, like that of churches, but brown, even to blackness, owing to this smoke hanging like a grey cloud above the room.

I am led to these remarks on the condition of the gallery panelling as now seen because a rather sharp controversy relating to the subject was carried on in the columns of the *Athenæum* during the autumn of last year. The facts which gave rise to it are these:—A tourist obtained permission to scrape a small portion of a panel in some part of the gallery where it would not be noticed, in order to assure himself that the wood of the panelling was oak. The village carpenter would have made this quite clear by showing him the grain of the first panel before which he chose to stop. The wash on the wood is so slight that the minute cavities of the grain are not filled up, and it is discernible to any one familiar with the surface of planed oak. The leave was, however, kindly given, and advantage has been taken of it not to scrape only (that would have been comparatively a mercy), but to anoint a considerable section of the room, including one of the doors, with boiled oil,—a muddy, chocolate-coloured substance, opaque as mock-turtle soup, that now hangs in waves and garlands on the surface, and has stained and defiled the fine old oak floor below.

The curiosity-shops of London stain and varnish new oak furniture to suit the demand of "old oak" cabinets and tables, but if they take artificial means to meet popular persuasions on this point, they do not clog the surface with such an unguent as boiled oil.

Sightseers will sometimes see antiquity only through spectacles of their own, as foreign romances see ourselves in some grotesque disguise suited to the preconceived notions of their readers. But Haddon Hall is too venerable to be clothed in greasy modern fustian. The family to whom it belongs have preserved it with great care, constant cost, and a genuine desire to keep for us one of those homes of old English hospitality, and that feudal attachment of rich and poor to each other, which are the best and noblest traditions of old rural life.

The Hall has survived under peculiar circumstances, unchanged by the fashions of the Hanoverian Dynasty. Not buried, like Pompeii, but fenced from wind and rain, its lead, stones, and timber secured against decay.

What personally (or otherwise) conducted tourists would propose to put a new nose on the Egyptian Sphinx, to varnish the frescoes of Pompeii, or to sandpaper the bas-reliefs of the Parthenon?

Haddon Hall would need some changes to fit it for the family residence, but while it is open to all visitors it is the veritable home of artists. They are trusted guests, go where they like, stay, paint, draw where they please. The shadows steal along the deserted floor from west to east; but for them these old rooms, once peopled by generations of sons and daughters who played and danced over the boards, are neither too lonely nor too grey. The ashy hue, the crust of age, the patina which time has laid over the surface of most things at Haddon, are its most attractive decorations. The boiled-oil will be gradually washed off with alkali, and the old colour will be restored as far as may be by that process. Sightseers have learned to keep pencils for sketch-books, and to leave diamond rings on the fingers of their sweethearts, instead of scribbling their names on walls, or scratching tender sentiments on glass quarries. Let them accept Haddon Hall, hoary and old, but still strong and solid, for what it is, and make no effort to change it for the Wardour-street buckram of to-day.

11, *Pembridge-crescent, W.* J. H. POLLEN.

MR. JOHN HONEYMAN ON THE MASONS OF GLASGOW CATHEDRAL.

SIR,—On page 130, Mr. Honeyman, F.R.I.B.A., says:—"The choir of Glasgow Cathedral bore internal evidence that it was designed from base to parapet by one man, and that very little more was left to the discretion of the thirteenth-century mason than they were in the habit of leaving to the masons of the nineteenth century." This does not exactly agree with the pretensions of the Freemasons, but it may be quite true for all that. It is very curious that in Glasgow, while the Incorporation of Masons there has existed at least from the year 1600 A.D. till now, there was no deacon-convener elected from the Masons until the present century. What is the explanation of this? Were the seventeenth and eighteenth-century masons all nobodies, or had they so exhausted their energies at the cathedral work that it required more than two centuries for them to come abreast of the other trades in the city?

It was to support the pretensions of the old Glasgow masons that the notorious Malcolm Canmore forged charter was "discovered" about the beginning of this century, and in virtue of which the lodge held its 831st (!) anniversary in December last. If the Masons cannot bring forward better evidence than this that they were the architects, as well as the builders, of the Cathedral, their title to the honour is but small.—I am, &c.,

W. P. BUCHAN.

The Student's Column.

TOWN DRAINAGE.

IX.—INCLINATION OF HOUSE DRAINS.

THE desirability of a rapid fall in house drains is not so great as is sometimes supposed. "Give it all the fall you can" is sometimes said to workmen laying a drain when no arrangements have been made for supervision, and the proper inclination of each part of the drain has not been previously determined. But without unnecessarily supposing that a drain be laid in this careless way, and taking it for granted that there will be proper supervision of the work, the drain need only have such a rate of fall as will carry off the sewage and the greatest quantity of rain-water coming into it; and with regard to the sewage alone, a moderate fall is better than a rapid one. The comparatively short length of any house drain makes it impossible for sewage to remain long on the premises when the joints are water-tight, and when the ordinary quantity of waste-water from a house is discharged into it; and with regard to jointing, we must in all cases suppose that the joints will be made water-tight. Unless that can be granted nothing further of any use can be said; and we must say that this applies not only to the horizontal portion of a drain but to all vertical pipes, including the soil-pipes of water-closets, the joints of which must be made air-tight. We are not at present concerned with these, but it would be absurd to suppose that the joints of these either cannot or will not be made air-tight. There is nothing whatever to prevent it, in the nature of the case, in the materials used, or in the time required and allowed to enable a workman to make them so. The English workman cannot, any more than he of any other nation, make a good thing without good materials and a sufficient time, but with these there is no occasion for the exercise of ingenuity in devising means of circumventing the supposed carelessness of the workman. The carelessness which does exist is, unfortunately, more often on the part of those who employ him.

If a fall be given to the drain corresponding with a sufficient velocity of the sewage during some part of every day by the ordinary discharge of the waste-water, that is better than a fall so rapid as to cause the water to run away from the solid parts of the sewage. The liquid should carry the solid with it, and if it do so, the time occupied in its transit to the sewer will in no case be of much importance. At certain times of the day the discharge of waste-water from houses is greater than the average run of the twenty-four hours, and at these times,—say twice a day, forenoon and evening,—the depth of water maintained for about a minute in a 6-in. pipe, laid with an inclination of 1 in 60, is sufficient to carry the solid part of the sewage with it, and to free the drain from the deposit which takes place at other times of the day during which a less quantity of water is being discharged. If the fall be greater, the velocity of any one bulk of water discharged into the drain will be greater at first, but the depth soon becomes reduced below that which is sufficient to carry all parts of the sewage with it, and as a velocity of 2 ft. or 2 ft. 6 in. per second in a 6-in. glazed earthenware pipe carrying a depth of sewage of 1 in. or 1½ in. is sufficient, it is better, for the special purpose of a house-drain, to maintain that depth and velocity rather than endeavour to acquire a greater velocity by means of a greater rate of fall, with the result of reducing the depth. The following small table exhibits the rate of flow at various depths in a 6-in. pipe at the two inclinations of 1 in 30 and 1 in 60.

6 in. Pipe.

Depth.	Inclination.	Velocity per second.	Quantity discharged per minute.
Ins.		Ft.	Cubic ft.
1	1 in 60	2·69	3·46
	1 in 30	3·81	4·89
1½	1 in 60	3·26	7·52
	1 in 30	4·62	11·64
2	1 in 60	3·67	12·59
	1 in 30	5·20	17·84
2½	1 in 60	4·02	18·62
	1 in 30	5·68	26·31
3	1 in 60	4·26	25·10
	1 in 30	6·03	35·52

But although it is desirable to limit the fall with the object of maintaining a greater depth of sewage in the drain, regard must be had to the rainfall coming into it. This varies with the area of the paved surface at the back of the house. The separation of rainfall from sewage, with the view to lessen the difficulties of dealing with the sewage at the outfall, should be effected to the utmost extent practicable in every case, and it may in many cases be effected to a great extent by a certain disposition of the sewerage works, but it will probably never become practicable to lay two house drains, one solely for sewage and the other for rain-water. The house-drain must carry not only the sewage, but as much of the rain-water falling upon the back premises of houses as cannot well be turned into another channel. The paved area from which rain-water flows into house-drains is extremely variable in extent. It may average 70 or 80 square yards, but is less in many, and much more in some cases. If 400 square yards be taken as an example of a large area, it may be sufficient for the purpose of seeing whether an inclination of 1 in 60 is sufficient for a house drain 6 in. in diameter. An extreme depth of rain may be taken at four hundreths of an inch per minute, continuing for half-an-hour, producing in that time 1·20 in. in depth. Some small part of this may, by soakage and evaporation, not reach the drain, but on a paved area this small portion may be neglected. The quantity, then, running off this area would be 12 cubic feet per minute. Taking the case in its most extreme form, and supposing the discharge of sewage to be occupying at the same same time a depth of 1½ in. in the bottom of the pipe, the quantity of sewage would be, say, 8 cubic feet per minute. Adding to this the 12 cubic feet of rain-water, the combined quantity would be 20 cubic feet per minute, and would, by the table, be carried off by the drain when running not more than half full.

If the drain with this rate of inclination run two-thirds full, the sectional area of the body of water would be ·139 square foot. The hydraulic mean depth would be ·1455 ft. Combining the inclination with this depth, it is found that there would be a velocity of 4·60 ft. per second, and a discharge at the rate of 38 cubic feet per minute. Deducting as before the 8 cubic feet of sewage, there would be room for 30 cubic feet of rain-water per minute. Dividing this by four hundredths of an inch, the area from which 30 cubic feet per minute would proceed is found to be 1,000 square yards. So that it may be said a 6-in. pipe laid with water-tight joints at a regular inclination of 1 in 60 is sufficient for the requirements of the house-sewage, and also for the greatest quantity of rain-water which can come into it.

It is only for the main portion of the drain that these results will hold good,—for a length, say, of 60 ft.,—and not for short branches. The most common diameter of pipe for the main portion of the drain is 6 in., but there are some reasons for preferring a diameter of 4 in. The objection to 4-in. pipes is that they look too small; a 6-in. pipe seems to be more important and better worth laying well. A 4-in. pipe is of insignificant appearance, and, perhaps, is too often looked upon as not worth so much attention and care in making the joints watertight, and laying the pipes in a perfectly straight line between the several points determined upon beforehand as those at which changes of direction are to be made. Yet if the same care be taken in these respects with 4-in. pipes as with 6-in., they will often make the better drain, because the numerous discharges of waste-water into the drain, many of which are but small in quantity, will oftener produce the desired depth, and solid sewage will remain unflushed away for shorter periods of time. Such a drain, although better for the house sewage than a larger one, may, of course, be too small to carry off the rain-water from the paved areas

and roofs of the back premises of houses in some cases. Without attempting to lay down any strict rule, one may see from the following small table how far, approximately, a 4-in. pipe may be used for this purpose. For the purpose

4-in. Pipe.

Depth.	Inclination.	Velocity per second.	Quantity discharged per minute.
Ins.		Ft.	Cubic feet.
1	1 in 60	2·66	2·71
	1 in 30	3·77	3·86
1½	1 in 60	3·11	5·60
	1 in 30	4·41	7·94
2	1 in 60	3·45	9·00
	1 in 30	4·87	12·74
2½	1 in 60	3·66	12·62
	1 in 30	5·19	17·87
3	1 in 60	3·77	15·83
	1 in 30	5·34	22·43

of exhibiting the capacity of a 6-in. pipe to carry off rain-water and sewage at a rate of inclination of 1 in 60, and 1 in 30, we assumed 400 square yards to be a large area,—it is much larger than the average,—from which a great rainfall must be carried off by the drain. Taking the same intensity of rainfall, viz., ·04 in. in depth per minute, continuing for half-an-hour, and producing in that time a depth of 1·20 in., and taking also the same area, 400 square yards, it may be seen that a 4-in. pipe would barely be sufficient, the inclination being 1 in 60, but that, running full, it would be sufficient at that rate of inclination to carry off the rain-water from that area if the quantity of sewage being discharged at the same time were 6 cubic feet per minute instead of eight, as we assumed it to be in the case of the 6-in. pipe; and, although we cannot expect the size of pipe to be at any time regarded in relation to the discharge of waste-water from time to time, and, therefore, must provide one sufficient for all circumstances, yet, if 6 cubic feet of sewage per minute be allowed to be as much as will be discharged at the same time as the rain-water is being carried off by the house drain, a 4-in. pipe, running full, will be sufficient for the area of 400 square yards; or, if the 8 cubic feet of sewage per minute be provided for, then it would be sufficient for an area of 333 square yards. If the 4-in. drain run only three-fourths full, it will carry off, beside the sewage, the rain-water from an area of 260 square yards, and so on; and it does not appear, therefore, that it is too small for most situations. It may remain a matter of opinion whether, from a mechanical point of view, a 4-in. pipe is sufficient. Experience varies on this point; but, perhaps, opinions founded on insufficient experience vary more often.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

4,413, Marbled Cast-iron. B. B. Lee and T. S. Neale.

According to this invention, two or more colours or shades are produced in a marbled or grained appearance upon cast-iron. A second coat or glaze is given to the "biscuit," or first coating, the different tints being put on by means of a brush in veins or streaks, or dashed, dropped, sprinkled, or sprayed thereon, and the article to which the colour is applied is then rapped with a mallet or shaken to cause the partial running of the wet glazes and bring them to a level. The glaze is fixed by burning or drying in the ordinary way.

4,660, Air-warming Arrangements for Fireplaces and Stoves. E. H. Shorland.

The object of this invention is the better arrangement of warming-gills and chambers for heated air applied as described in a previous specification (No. 3,999, '74). The gills were generally arranged partly vertical and partly horizontal, but by this patent they are arranged so that they radiate from any imaginary point above the upper end of the gills, or so that the space between any two of the gills is wider at the bottom or inlet end than at the top. The effect of this is that the air is caused to travel more rapidly as it ascends, and as it becomes warmer so there is a larger flow of air through the warming chambers.

4,908, Flushing Cisterns. W. & W. H. Cowan.

In this modification of a previous patent the ball-valve is enclosed within and under the roof of the plunger, and the ball-lever is enclosed entirely within the tank, and is thus protected from injury or external interference. Another modification is that the ball rises under a cupola or dome in the roof of the cistern. A very small hole governs the rising of the ball, the air being slowly expelled through this orifice as the ball rises. Some other minor alterations are also described. These are made with a view of obviating the defects in existing apparatus.

18,896, Roofing-tiles. F. Hunsinger.

The object of this invention is to provide tiles which shall effectually resist the ingress of the wind, and be at the same time cheaper to manufacture and to fix, and safer against slipping off or being blown off. The tiles are hexagon-shaped, and a ledge is made at an angle on the tile. On the under side, directly under and covered by the angle-point of the ledge, a hole or impression is made by which the tile may be hung on nails.

1,515, Machines for Making Bricks and Tiles. C. A. Eissner.

The improvements which are the subject of this invention consist (1) in the manner of, and direct means for, actuating the cutters, and (2) in the mechanism or gear by which the movement of the material sets the actuating mechanism in motion, so that the cutting of the material is rendered dependent on the feed movement. The improvements are intended for that class of brick and tile machines in which the clay or material is cut into predetermined lengths.

3,560, Handles for Doors. J. Kaye.

The object of this invention is to more effectually secure the bush in the handle in such a way that will admit of easy and secure adjustment on the spindles, and also form the bearing part. The specification describes at length the mechanical means by which this is accomplished.

5,205, Match-boarding, &c. C. L. Smiles and W. J. Davidson.

The side edges of the boards are, according to this invention, formed with a wedge-like shape in cross-section, and a shoulder or recess, and the joint may be covered with a small strip to hide it if desired.

NEW APPLICATIONS FOR PATENTS.

Feb. 11.—2,365, J. Kerr, Stencil-holder for Painters and Decorators.—2,374, W. Leggott, Securing Casement-windows.—2,379, H. Potter and E. Assmann, Clay-cutting Machines.—2,388, R. Fox, Chimney-pots.—2,401, J. Wilkes, Press for Bricks, Tiles.—2,403, J. Hughes, Fireproof Material for Decorative Building Purposes.—2,408, H. Lake, Ornamenting Walls, &c.

Feb. 12.—2,426, H. Le Musurier, Safety Stapling and Automatically Releasing Emergency Bolts or Door-locks, &c.—2,468, J. Evans, Fasteners for Window-sashes, Sliding-doors, &c.—2,469, L. Schlentheim, Marble Mastic.—2,477, R. Knight, Heating and Ventilating Houses.

Feb. 13.—2,520, W. Davidson, Apparatus for making Eaves, Gutter-hooks, and Roof-ridge Straps.—2,526, J. Taylor, Tie-bricks for Cavity Walls.—2,530, C. Hickton, Automatic Cupboard-door Fastener.—2,539, De Pennefather, Ventilating.—2,546, E. Lisle, Chimney Cowls.—2,556, T. Werminck, Wood Pavement.—2,573, W. Punchard, Apparatus for Depositing Concrete, &c.

Feb. 14.—2,602, A. and J. Gilbert, Chimney-pots.—2,632, J. Sugden, Artificial Building Materials.

Feb. 15.—2,688, W. Defries and V. Feeny, Hinges, 2,692, W. Poole and A. McDonald, Testing the Joints, &c., of Drain-pipes.—2,702, E. De Mejer and T. Greenwood, Paper Stucco.

Feb. 16.—2,741, G. Newman, Door-springs and Checks.—2,780 and 2,781, A. Ponton and others, Artificial Stone.

PROVISIONAL SPECIFICATIONS ACCEPTED.

17,435, W. Hartley and others, Portable Stack-pipe.—18,269, J. and B. Lisle, Draught and Weather Excluder for Doors and Windows.—18,388, S. Wright and R. Bate, Flushing Cisterns for Water-closets, &c.—106, E. Hutchins, Chimney-tops, &c.—412, U. Smith, System of Sewerage.—413, U. Smith, System of Sewerage.—515, A. Day and F. Green, Window-sash fastener.—517, S. Hazeland, Wood-planing Machines.—639, G. Jennings, Water-waste preventers for the Supply of Water to Closets, &c.—657, F. Baker, Fastenings for Cupboard-doors, &c.—777, G. Goodwin and W. How, Tip-up Closet-pans, &c.—883, A. Hamilton, Door-handles.—908, J. Woodard, Sash-fastener.—908, J. Woodard, Ventilating Rooms.—974, J. Gilmore and W. Clark, Locks and Fastenings.—977, J. Harper, Portable Scaffold.—998, R. Newell, Ventilator or Chimney-top.—1,014, W. Hindle, Water-closets.—1,158, W. Woodword and J. Walton, Fastenings for Doors and Gates.—1,282, H. Blackwood, Artificial Stone.—1,312, J. Barrow, Chimney-tops.—1,363, J. Clayton and C. Tindall, Water-closets.—1,435, A. Fowler, Privies and Water-closets.—1,539, J. Ingleson, Window-sashes and Sash-frames.—1,642, W. Crichton, Raising, Lowering, and Locking Window-frames.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

3,634, W. Fraser, Noiseless Closing of Doors.—5,521, W. Seward, Valves for Baths and Lavatories.—5,728, O. Elphick, Water-waste Preventors.—10,515, J. Auth, Window-glass Setting.—18,042, A. Harris and H. Lucock, Spring Catches for Doors.

Ancient Sculpture in Bronze.—Want of space this week compels us to hold over the reports of Mr. A. S. Murray's second and third lectures at the Royal Academy on this subject until next week. We reported and illustrated his first lecture last week (see p. 145, *ante*).

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

FEB. 18.

By G. A. Wilkinson.

Forest-hill, Cannonbie-road—The freehold residence, "Highlands"	£509
The freehold residence, "Hill View"	530
Peckham—1, Moncrieff-street, 71 years, ground-rent £4. 10s.	445

By R. H. Evans.

Islington—67, Copenhagen-street, 32 years, ground-rent £6. 6s.	325
94, Gifford-street, 78 years, ground-rent £6	305
50, Bingfield-street, 60 years, ground-rent £3	570

FEB. 19.

By P. D. Tuckett.

Islington—7 and 8, Halliford-street, 53 years, ground-rent 3s.	1,300

By H. Rutley, Son, & Vine.

Tottenham Court-road—8, Little Goodge-street, freehold	785

By Geo. Goulesmith, Son, & Co.

Notting-hill—117 and 119, Clarendon-road, 46 years, ground-rent £10	550
Battersea—76, Meyrick-road, 57 years, ground-rent £4. 5s.	175
80, 82, and 84, Meyrick-road, 57 years, ground-rent £12. 15s.	530

FEB. 21.

By Dyer, Son, & Hilton.

Lewisham—6, Limes-grove, 21 years, ground-rent £1	180

By R. J. Collier.

Marylebone—32, Upper Baker-street, 13 years, ground-rent £7. 7s.	600
19, Upper Montague-street, 18 years, ground-rent £10. 10s.	580
20 and 21, Upper Montague-street, 18 years, ground-rent £12. 10s.	1,170
9 and 12, Dorset-square, 20 years, ground-rent £56. 1s.	2,630
14 to 17, Dorset-square, 20 years, ground-rent £136. 10s.	5,340
18 and 20, Dorset-square, 20 years, ground-rent £53	2,640
24, Dorset-square, 20 years, ground-rent £31. 10s.	1,290
25, Dorset-square, 20 years, ground-rent £31. 10s.	1,180
St. John's Wood—30, Clifton-hill, 48 years, no ground-rent	900
75, Hamilton-terrace, 47 years, ground-rent £13	1,480
81 and 82, Hamilton-terrace, 34 years, ground-rent £4	1,530

By Newbon & Harding.

Canonbury-park North—No. 18, term 46 years, ground-rent £5. 8s.	500
King's Cross-road—No. 209, freehold	705
Barnsbury—18 and 19, Victoria-street, freehold	585
Islington—41, Gifford-street, 56 years, ground-rent £6	270
18 and 22, Havelock-street, 66 years, ground-rent £12	745
31 and 32, Charles-street, 61 years, ground-rent £16	360
3, Upper Southampton-street, 37 years, ground-rent £5	378
Gray's Inn-road — 33, Gough-street, 23 years, ground-rent £8. 10s.	190
Euston-road — 96, Drummond-street, 31 years, ground-rent £6	305
Kensington—5 and 6, Warwick-road, 33 years, ground-rent £10	630
South Hackney—63 and 70, Harrogate-street, 55 years, ground-rent £12	480
Stoke Newington—21 and 23a, Clonbrock-road, 79 years, ground-rent £12	285
23, Clonbrock-road, 79 years, ground-rent £13	315
Finsbury Park—77, 79, and 81, Alsen-road, 78 years, ground-rent £13. 10s.	340
Holloway—64, Cromwell-road, 90 years, ground-rent £6. 10s.	155
61, Hampton-road, 90 years, ground-rent £10	95
44, Hampton-road, 74 years, ground-rent £6	150
Euston-road—7 and 11, North Crescent-mews, 18 years, ground-rent £4. 4s.	85
King's-cross—1 and 2, Field-street, 2 years, ground-rent £5	20
East Finchley—4, Torring-terrace, 65 years, ground-rent £2. 12s.	310

FEB. 23.

By R. Millard.

City of London—18, 19, and 20, Noble-street; and 14 and 15, Silver-street, freehold, area 7,400 ft.	27,000

By Baker & Sons.

City, Fenchurch-street—Ground-rent of £900, reversion in 28 years	14,600
Dorset-square—60, Balcombe-street, 32 years, ground-rent £4. 4s.	720
22 and 23, Upper Park-place, 32 years, ground-rent £4. 4s.	655

By R. Reid.

Pimlico—4, Palace-street, 22 years, ground-rent £30	360
Soho—26, Berwick-street, 60 years, ground-rent £100	145

Population and Open Spaces.—Dr. R. L. Gould, of the Government Harbour Department, U.S.A., has made an examination of the position of some of the largest cities in the United States as compared with the principal cities of Europe. He produces conclusive evidence that the movement of the rural population towards urban centres, which is one of the most marked features of the old world, is equally pronounced in the United States, and enters, at some length, upon a discussion of the value of open spaces to the health of a community. Dr. Gould has prepared tables in which he summarises the results of his inquiries. From these it appears that Edinburgh has the largest amount of open space in proportion to the number of its inhabitants, having an acre of space to every 246 inhabitants. Prague comes next with an acre to every 247 persons. London has an acre to every 694.

MEETINGS.

SATURDAY, MARCH 2.

Association of Public Sanitary Inspectors. — Sixth Annual Dinner, First Avenue Hotel, Holborn. 6 p.m.

Royal Institution.—The Rt. Hon. Lord Rayleigh, M.A., F.R.S., on "Experimental Optics (Polarisation: Wave Theory)." II. 3 p.m.

South Kensington Museum. Mr. J. Starkie Gardner on "Iron and Artistic Ironwork." I. 3 p.m.

MONDAY, MARCH 4.

Royal Academy (Lectures in Sculpture). — Professor J. H. Middleton on "The Development of Mediæval Sculpture in Tuscany as compared with that in other parts of Italy." I. 8 p.m.

Society of Arts (Cantor Lectures).—Mr. Walter Crane on "The Decoration and Illustration of Books." I. 8 p.m.

Surveyors' Institution.—8 p.m.

Society of Engineers.—Mr. G. R. Strachan on "The Construction and Repair of Roads." 7·30 p.m.

Clerks of Works' Association (Carpenters' Hall).—8 p.m.

Leeds and Yorkshire Architectural Society.—Mr. W. Scott Morton on "Colour in Architecture and Interior Decorations." 7.30 p.m.

TUESDAY, MARCH 5.

Institute of Builders.—Mr. J. Randall on "The Inclusion of Provisional Amounts in Contracts." 8 p.m.

Institution of Civil Engineers.—Mr. Gisbert Kapp on "Alternate Current Machinery." 8 p.m.

Sanitary Institute (Lecture for Sanitary Inspectors).—Mr. B. W. Richardson, F.R.S., on "General History, Principles, and Methods of Hygiene." 8 p.m.

Birmingham Architectural Association.—Mr. T. Blashill on "Vienna."

Manchester Architectural Association.—Mr. L. Booth, on "Commission." 7.30 p.m.

Glasgow Architectural Association.—Annual Business Meeting.

WEDNESDAY, MARCH 6.

Carpenters' Hall (London Wall).—Mr. Banister Fletcher on "Art and Design in Woodwork, &c." 8 p.m.

Civil and Mechanical Engineers' Society.—Mr. E. A. Brayley Hodgetts on "Liquid Fuel." 7 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting. 8.30 p.m.

British Archæological Association.—Mr. A. G. Langdon on "The Ornamentation of the Ancient Crosses of Cornwall." 8 p.m.

Society of Arts.—Prof. Silvanus P. Thompson on "Arc Lamps and their Mechanism." 8 p.m.

Liverpool Engineering Society.—(1) Mr. C. S. Pain, Assoc. Inst. C.E., will show a number of lantern slides of the Vyrnwy Waterworks. (2) Discussion will be raised upon the following subjects:—(*a*) "The Relative Advantages of Steel and Iron for Engine Shafts," by Mr. T. L. Miller, Assoc.-M. Inst. C.E. (*b*) "Is there any 'Fibre' or 'Grain' in Iron?" by Prof. H. S. Hele Shaw, M. Inst. C.E. (*c*) "The Cause of Increased Tenacity when the Limit of Elasticity is exceeded in Ductile Materials," by Prof. H. S. Hele Shaw, M. Inst. C.E. 8 p.m.

THURSDAY, MARCH 7.

Society of Antiquaries.—Ballot for the Election of Fellows. 8.30 p.m.

Royal Archæological Institute.—Mr. W. H. St. John Hope, on "The Carmelite Priory, or House of White Friars at Hulne." 4 p.m.

Edinburgh Architectural Association.—Mr. J. Clark on "Ornament." 8 p.m.

FRIDAY, MARCH 8.

Royal Academy (Lectures in Sculpture).—Professor J. H. Middleton on "The Development of Mediæval Sculpture in Tuscany, as Compared with that in other Parts of Italy." II. 3 p.m.

Royal Institution.—Professor Oliver Lodge, F.R.S., on "The Discharge of a Leyden Jar." 9 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. C. F. Smith on "Mining in Spain, with special reference to the Lead Mines of Linares." 7.30 p.m.

SATURDAY, MARCH 9.

South Kensington Museum.—Mr. J. Starkie Gardner on "Iron and Artistic Ironwork." II. 3 p.m.

Royal Institution.—The Right Hon. Lord Rayleigh, M.A., F.R.S., on "Experimental Optics (Polarisation: Wave Theory)." III. 3 p.m.

Miscellanea.

The English Iron Trade. — The English iron market still shows an unmistakable tendency towards an all-round rise. Pig-iron has been in an especially buoyant condition this week, the North of England crude iron trade and the Glasgow warrant market taking the lead. The quotation of No. 3 Cleveland pig has been put up 1s. since our last report, and the movement is still upwards. At Glasgow, in an active market, prices have been advancing from 42s 7d. cash up to 43s. and higher, while Scotch makers have followed with quite phenomenal rises, ranging from 6d. to 2s. a ton. From Lancashire, advances from 6d. to 1s. a ton are reported, while Staffordshire makers fully maintain their rates. Although only a moderate trade is doing in Bessemer iron in the north-west, owing to the fact that makers are closely filled up with orders, quotations have been advanced 9d. per ton. As business in manufactured iron is fairly brisk, it is expected that prices will shortly be raised, the increased cost of pig-iron and coke also necessitating such a step. Tin-plates are dull, but unchanged in price. The steel trade is very active in rails, plates, and angles, and prices are well held up; but blooms and slabs, which are only in moderate request, have gone back to the former quotation of £3. 17s. 6d. There is a lull in the shipbuilding trade, no fresh orders being reported this week. Engineers, like shipbuilders, continue active.—*Iron.*

British Archæological Association.—At the meeting of this Association, on the 20th ult., Mr. C. H. Compton in the chair, the progress of the arrangements for holding this year's congress at Lincoln was detailed. Mr. Earle Way exhibited some articles of pottery, of Roman date, found at Kent-street, Southwark. Mr. Winstone reported the discovery of a large series of articles of pottery in making excavations recently on the premises of Messrs. Harrison, St. Martin's-lane. Several specimens were exhibited, the articles being mostly of delft-ware, dating from the time of Queen Elizabeth. A discussion ensued as to whether some of the articles produced were not of English manufacture. Mr. Prigg described some of his recent discoveries at Elveden, near Thetford. Excavations on the site of an ancient burial-place revealed three large urns of brown-ware, which had been deposited with their necks downwards, and covered over by a circular *situla*, some of the metal mountings of which remained. The urns have the appearance of having been intended for burial purposes; but, although burnt bones were met with outside the circle of the *situla*, none were found with them. Mr. Prigg referred to the local controversy that has arisen relative to the age of the deposit, it being contended that, because some ornamentation of Celtic style occurs on the mountings, that the date must be pre-Roman. The meeting was unanimous, however, that the urns, two of which were exhibited, were of undoubted Roman date. A large hand-bell found at Mildenhall, of early Christian form, was also exhibited by Mr. Prigg. A paper was then read by Mr. E. P. Loftus Brock, F.S.A., on "The Ancient Churches of Cheshire." The dedications were passed in review, and it was shown that, in a county where many traces of the ancient Welsh saints might have been expected, they hardly occur at all. There are, however, many dedications to early Saxon saints, and few or none to those of Danish origin, although the Danes settled largely in the district. The architectural peculiarities, particularly the existence of many timber-built churches, were dwelt upon at length.

Moving a House in Coblentz. — The *Deutsche Baugewerks Blatt* gives the following account of the recent moving of a house in Coblentz. The house was situated close by the Löhr-chaussée, and had to be removed sufficiently away to make room for a new Custom-house. To this end it would have to be moved 5 to 7 mètres aside, and 15 to 20 mètres further back. Previous to moving, the building was cleared, doors and windows removed, as well as a gable over the entrance. This having been done, and the foundations laid bare, huge rollers were inserted between the latter and the house itself, the bed on which the building was moved being made of heavy balks of timber. By the aid of powerful windlasses and pulleys on both sides, the house was raised on to the bed, when the whole was moved slowly by another set of winches. The number of rollers employed was only five, one being alternately shifted to the front. The new foundations for the building being already prepared, the task of placing it upon them was comparatively easy. So quietly was the moving effected that a number of pigeons kept in the loft did not appear the least fluttered by the proceedings, flying out and in as usual.

Testing for Dampness.—Gelatine, according to the *Wiener Bauindustrie-Zeitung*, is a capital means for ascertaining whether a wall is thoroughly dry or not. The sheet gelatine of commerce is the best for the purpose. The thinnest pieces are selected; they are soaked in water for about a quarter of an hour, until they are quite soft, spread out flat on a greased sheet of glass, and stretched with the fingers until any folds and creases that may exist are smoothed out, and the whole is made as thin and uniform as possible. The sheets are then thoroughly dried in the air, rough or uneven edges are trimmed off, and the whole cut into strips about 4 in. long and 2 in. wide, for use in testing. If kept flat in a dry place, these gelatine strips are very sensitive to moisture. If a wall if suspected of being damp, without showing it outwardly, a slip of gelatine is moved slowly over it near its surface, but without touching it. If any damp spots exist, they are immediately indicated by the curling of the gelatine as it passes near them.

St. Michael's, Coventry.—Mr. G. Woodcock, who recently gave 10,000*l.* to the restoration of this church, has now offered to give further help.

Liverpool Engineering Society. — The ninth ordinary meeting of the present session of this Society was held at the Royal Institution, Colquitt-street, on February 20, Mr. H. H. West, M.Inst C.E., Vice-President, in the chair, when a paper was read by Mr. G. Farren, Assoc.M.Inst.C.E., upon "The Construction of Small Harbours, and the Silting they give rise to." The author commenced by stating that twenty years ago he was called upon to design a harbour upon the north-western coast of Carnarvonshire for the use of a private company with which he is now intimately connected, and, as he considered this to be a typical case of the many points to be considered and the difficulty to be overcome in designing such a structure, he took it as his text for the present paper. He then described very fully the physical position and conditions of the site of the proposed harbour, illustrating by numerous charts and diagrams the nature of the prevailing local winds, tides, and currents. The second portion of his paper consisted of a full description of the nature of the proposed pier and breakwater, and of the many difficulties he had to contend with in the construction of them, one violent storm destroying in an hour what had taken months to build; the wind and sea raging so fiercely that stones weighing many tons were tossed about like so many blocks of wood. He then gave the actual cost of construction of the different portions of the work. The third portion of his paper described fully the effects of the constructions of the pier and the breakwater upon the shifting sands, mentioning and explaining the peculiar phenomenon of the off-shore winds causing the sand to accumulate in the harbour, and the in-shore winds removing them. He concluded with observations and recommendations as to the construction of similar harbours, and of the steamers which are generally used for navigating such coasts. A long and interesting discussion followed upon the various points raised in the paper, and after the author had replied fully, a hearty vote of thanks was accorded him.

Liability of Architects.—We have been asked to give publicity to the following announcement:—"At a meeting of the Philadelphia Chapter of the American Institute of Architects, held on February 12, a committee was appointed to draw up a blank form of contract for use between the architect and the owner, no such thing being in general use in the United States. It is desired in this form to clearly define the responsibility of the architect, as well as his duties, as by recent judicial decision in New York, this responsibility seems to be without limit, an architect being held in heavy damages because a chimney-flue was not so proportioned as to insure the most economical consumption of coal in a steam-heating apparatus. Any blank forms of similar contracts, or information relating to the subject, would be very gladly received by the secretary of the committee, Mr. Edward Hurst Brown, 1,305, Arch-street, Philadelphia, U.S.A."

The Swedish Wood "Villa" Industry.—The manufacture of wood "villas" for foreign countries, particularly the warmer ones, is extensively carried on in Sweden, the principal factory being the Ligna Company of Stockholm. The buildings are erected in Sweden, taken to pieces, and re-erected at their destination. An order from South America has just been received for twenty villas, whilst a large one is in course of erection in the Paris Exhibition grounds.

Saturday Lectures on Science and Art.—We are asked to mention that, by permission of the Lords of the Committee of Council on Education, the Saturday Lecture Society have arranged for a series of lectures in the lecture-theatre of the South Kensington Museum on Saturdays. Two of this series will be delivered by Mr. J. Starkie Gardner on "Iron and Artistic Ironwork," on the 2nd and 9th of March at 3 p.m. Tickets can be obtained at the Museum entrances, price 1s. each lecture.

PRICES CURRENT OF MATERIALS.

TIMBER.		£.	s.	d.	£.	s.	d.
Teak, E.I.	load	9	0	0	14	0	0
Sequoia, U.S.	foot cube	0	3	3	0	3	6
Ash, Canada	load	3	10	0	5	0	0
Birch ,,		3	10	0	6	0	0
Elm ,,		4	0	0	5	0	0
Fir, Dantzic, &c.		2	0	0	4	0	0
Oak ,,		2	10	0	4	10	0
Canada ,,		5	10	0	7	10	0
Pine, Canada red		3	5	0	4	0	0
,, yellow		3	10	0	5	10	0
Lath, Dantzic	fathom	4	10	0	5	10	0
St. Petersburg		5	0	0	6	10	0

TIMBER (*continued*).	£. s. d.	£. s. d.
Wainscot, Riga, &c.....log	2 15 0	4 5 0
,, Odessa, crown.....	2 15 0	3 5 0
Deals, Finland, 2nd and 1st...std.100	9 10 0	10 10 0
,, ,, 4th and 3rd.....	7 10 0	9 0 0
,, ,,	7 10 0	8 10 0
Riga	11 10 0	15 0 0
St. Petersburg, 1st yellow	9 10 0	11 0 0
,, 2nd ,, ...	8 10 0	10 10 0
,, white	8 10 0	16 0 0
Swedish	9 10 0	17 0 0
White Sea	16 0 0	26 10 0
Canada, Pine, 1st	11 0 0	17 10 0
,, ,, 2nd	8 0 0	10 10 0
,, ,, 3rd, &c.	9 10 0	10 10 0
,, Spruce, 1st	7 0 0	8 10 0
,, 2nd and 2nd	6 10 0	20 0 0
Deals—New Brunswick, &c. std.100	6 15 0	8 15 0
Battens, all kinds	0 11 0	0 14 6
Flooring Boards, sq., 1 in., prepared, First	0 8 0	0 10 9
Second	0 5 6	0 7 9
Other qualities	0 0 4½	0 0 4½
Cedar, Cuba.....foot	0 0 4	0 0 4½
Honduras, &c.....	0 0 4½	0 0 6½
Mahogany, Cuba	0 0 4½	0 0 6½
St. Domingo, cargo average	0 0 4½	0 0 5½
Mexican ,, ...	0 0 5	0 0 6½
Tobasco ,, ...	0 0 5	0 0 6½
Honduras ,, ...	4 0 0	12 0 0
Box, Turkey .....ton	12 0 0	19 0 0
Rose, Rio .....ton	12 0 0	18 0 0
Bahia	0 0 6	0 1 0
Satin, St. Domingo .....foot	0 0 9	0 1 3
Porto Rico	0 0 4½	0 0 6½
Walnut, Italian .....foot		

METALS.	£. s. d.	£. s. d.
IRON—Bar, Welsh, in London...ton	5 5 0	5 10 0
,, ,, at works in Wales ...	4 15 0	5 0 0
,, Staffordshire, in London ...	5 10 0	6 10 0
COPPER—		
British, cake and ingot..... ton	79 10 0	80 0 0
Best selected	79 0 0	80 0 0
Sheets, strong	80 0 0	0 0 0
Chili, bars	0 0 0	0 0 0
YELLOW METAL.....lb.	0 0 7	0 0 7½
LEAD—Pig, Spanish .....ton	12 10 0	0 0 0
English, common brands	12 15 0	0 0 0
Sheet, English.....	14 0 0	0 0 0
SPELTER—		
Silesian, special .....ton	17 10 0	17 12 6
Ordinary brands.....	17 7 6	17 10 0
TIN—		
Straits.....ton	95 0 0	0 0 0
Australian	95 0 0	0 0 0
English Ingots.....	97 10 0	0 0 0
ZINC—English sheet .....ton	21 0 0	22 0 0

OILS.		
Linseed .....ton	18 10 0	18 15 0
Cocoanut, Cochin	27 10 0	23 10 0
Ceylon	26 10 0	0 0 0
Palm, Lagos	35 0 0	0 0 0
Rapeseed, English pale	29 10 0	0 0 0
,, brown	28 0 0	0 0 0
Cottonseed, refined	24 0 0	0 0 0
Tallow and Oleine	19 0 0	45 0 0
Lubricating, U.S.	5 0 0	6 0 0
,, refined	7 0 0	12 0 0
TAR—Stockholm .....barrel	1 2 0	1 2 6
Archangel	0 14 0	0 14 6

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page.
Proposed Extension of Infirmary, Leeds ...	The Board	Not stated	Not stated.	i.
Proposed New Offices	Frome Union	20*l.* and 5*l.*	April 13th	xiii.

CONTRACTS.

Nature of Work, or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Works and Materials	Hendon Local Board ...	S. S. Grimley	Mar. 4th	xiii.
New Sewer, &c.....	Com. of Sewers.....	*Official*	Mar. 5th	xiv.
Roadmaking Works	Lewisham Bd. of Wks.	do.	do.	xiv.
Articles and Works	Tottenham Local Bd.	J. E. Worth	do.	xiv.
Altering Soil Pipes at Infirmary	Lambeth Guardians ...	*Official*	Mar. 6th	ii.
Broken & Unbroken Stone for Macadamising	Hull Corporation	A. E. White	Mar. 7th	xiii.
County Police Station	Kent Justices of the County	*Official*	do.	ii.
Alterations, &c., to School, Hammersmith ...	Kensington School Dis.	A. & C. Harston	do.	ii.
Steel Bowstring Girder Bridge, &c.	Co. Mayo Grand Jury	*Official*	Mar. 8th	ii.
Extension of Bridge, Lowering Hill, &c.....	Cheddingfold Road Improvement Committee	Welman & Street.....	Mar. 11th	xiv.
Works and Materials	St. Giles' Bd. of Wks.	*Official*	do.	ii.
Do. do.	do.	do.	do.	ii.
Venetian Blinds and Fittings.....	Met. Asylums Board ...	do.	do.	ii.
Supply of Red Deal and Batten Ends.....	City of London Union	do.	do.	xiv.
Works and Materials	Hornsey Local Board...	T. de Courcy Meade ...	do.	xv.
Brick Culvert, Concrete Wall, &c.....	do.	do.	do.	xv.
Engine and Boiler House, and Water Tower	Halstead Local Board...	J. Church	do.	xv.
Surface Drawing, Levelling, &c.	Kingston Corporation...	*Official*	do.	xiii.
Granite and Flints.....	do.	do.	do.	xiii.
Works and Materials	do.	do.	Mar. 12th	xiv.
Construction of Aqueduct	Manchester Corporation	G. H. Hill	do.	xiii.
Works and Materials (Plymouth Sub-Dist.)...	War Department.....	*Official*	Mar. 13th	xiii.
Widening Railway, York	L. & N. W. Ry. Co.....	do.	do.	xiv.
Steel and Iron Girder Work	do.	do.	do.	xiv.
Removal of Sweepings, Refuse, Dust, &c.....	Chiswick Local Board...	A. Ramsden	do.	xv.
Works and Materials	do.	do.	do.	xv.
Addition to Bishop Auckland Station	North Eastern Railway	W. Bell	do.	ii.
Drinking Fountain (Stone)	Llandudno Imp. Com.	T. T. Marks	do.	ii.
Works and Repairs to Buildings	Comrs. of H.M. Works	*Official*	Mar. 14th	xiii.
Sewerage Works.....	Willenhall Local Bd. ...	B. Baker	Mar. 16th	xiv.
Works and Materials	Bermondsey Vestry.....	*Official*.....	Mar. 18th	xiv.
Oak Park Fencing.....	Met. Board of Works	do.	Mar. 19th	xv.
Repairs, &c., to Buildings in Parks.....	do.	do.	do.	xv.
Waterworks	Uckfield Waterwks Co.	H. B. Nichols	Mar. 20th	xiii.
Main Outfall Sewer.....	Ystradyfodwg, &c., Main Sewage Board...	Chatterton & Bazalgette	Mar. 21st	xv.
New Chapel, Slough.....	The Trustees	A. E. Pridmore	Mar. 23rd	xiv.
New Buildings for Temporary School.....	Tottenham School Bd.	C. Bell	Not stated.	ii.
Fire-guards, Pokers, Scuttles, and Scoops ...	School Bd. for London	*Official*	do.	xiii.
Supply and Fixing of Blinds	do.	do.	do.	xiii.
Cleaning Clocks.....	do.	do.	do.	xv.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Clerk of Works	Woolwich Union	£3 per week.....	Mar. 4th	ii.
Clerk of Works	Covestry Union	do.	Mar. 5th	xix.

TENDERS.

[Communications for insertion under this heading must reach us *not later than 12 Noon on Thursdays.*]

BIRMINGHAM. — For erecting a house, "The Cedars," Calthorpe-road, Edgbaston, for Mr. James Hinks. Messrs. Bateman & Bateman, architects, 13, Waterloo-street, Birmingham :—

	A.	B.	C.	D.
Bissett & Sons.....	£3,150	£386	£840	£4,376
Thos. Smith	2,895	408	759	4,066
Sapcote & Sons	2,885	375	730	3,990
Barnsley & Sons	2,818	412	758	3,988
John Bowen.....	2,767	360	745	3,868

A. House. B. Conservatories. C. Stables and Fencing. D. Total.

[Amount of accepted estimate, 3,260*l.*]

CROYDON.—For the erection of four villa residences, Birdhurst-rise, for Mr. J. Rendall. Mr. E. C. Homer, architect, 99, Gresham-street, E.C. :—

H. D. Wood (accepted)..... £3,534 0 0

BROMLEY (Kent).—For making-up Hawkesworth-road, for the Bromley Local Board. Mr. Hugh S. Cregeen, surveyor :—

J. Mowlem & Co.....	£182	0	0
A. Palmer	174	18	4
T. Lansbury	155	0	2
E. Peill & Sons (accepted)	140	10	1½

DEAL.—For proposed sea-wall and esplanade, for the Deal Town Council. Mr. A. Dryland, Engineer and Borough Surveyor, Deal :—

Neave & Co., Paddington	£4,038	0	0
W. Cunliffe, Dorking	3,990	0	0
C. Home, Ramsgate	3,609	0	0
J. J. Wise, Deal	3,479	0	0
W. & T. Denne, Walmer	3,223	0	0
G. H. Denne & Son, Deal.....	3,140	0	0
Trollope & Trevers, Deal (accepted)	2,971	10	0

FRINTON-ON-SEA.—For completion of two villas, Marine Parade, for Mr. J. F. Hepburn. Mr. E. C. Homer, architect, 99, Gresham-street, E.C. :—

J. Nicholls (accepted) £153 0 0

FULHAM.—For road-making and paving works in the parish of Fulham. Mr. J. P. Norrington, Surveyor :—

	A	B	C	D	E	F
	£	£	£	£	£	£
Coat.....	*475	*428	325	*460	*312	*403
Adams.....	549	—	341	—	367	506
Nowell & Robson...	525	506	290	510	340	540
Mears	535	530	364	545	352	590
Tomes & Wimpey .	488	475	297	488	334	537
Neave & Son	484	483	273	500	331	533
Wall.....	698	—	—	650	429	670
Rogers.....	527	530	333	493	369	557
Trehearne	531	490	—	536	355	560

A. Bettridge-road. D. Linver-road.
B. Purcell-crescent. E. Cortayne-road.
C. Portland-place. F. Alderville-road.
* Accepted.

GILLINGHAM (Chatham).—For the erection of nave and aisles of St. Barnabas' Church, Gillingham, Chatham. Messrs. J. E. K. & J. P. Cutts, architects, 28, Southampton-street, Strand :—

Helbronner, London	£5,882	10	0
Staines & Son, London	4,784	0	0
R. Jennings, Horley	4,700	0	0
Manchtslow Bros., Horsmonden.....	4,685	0	0
H. Burnell, London	4,625	0	0
H. Willcock, Wolverhampton	4,584	0	0
King Bros. & Co., South Norwood ...	4,425	0	0
C. E. Skinner, Chatham	4,417	0	0
Bishop Bros., Birling.....	4,370	0	0
Cornish & Gaymer, North Walsham	4,335	0	0
J. Tyerman, London	4,300	0	0
T. Callund & Son, Rochester	4,270	0	0
George Dobson, Colchester	4,170	0	0
Hugh Knight, Morden	4,055	0	0
W. C. Snow, New Brompton	4,050	0	0
Foster & Dickson, Rugby	4,040	0	0
P. Peters, Horsham	3,995	0	0
G. E. Hawes, Norwich	3,990	0	0
Goddard & Sons, Farnham	3,963	0	0
W. Gibson, Exeter	3,960	0	0
Multon & Wallis, Gravesend	3,923	0	0
J. W. Bunning & Son, London*	3,896	0	0
J. G. Naylar & Son, Rochester	3,847	0	0
Jacklin & Whitehead, Royston	3,830	0	0
J. Shillitoe & Son, Bury St. Edmunds	3,800	0	0
Stanley Ellis, Guildford...	3,795	0	0
G. E. Wallis & Sons, Maidstone.....	3,783	0	0
Laurance Seager, Sittingbourne	3,765	0	0

* Too late.

HARTLEY.—For building billiard-room, and alterations to Hartley House, for Mr. C. W. Bradley. Mr. E. C. Homer, architect, 99, Gresham-street, E.C. Quantities by Mr. G. Silvester :—

Lucas	£451	0	0
Hollingsworth	412	0	0
Staines & Son.....	394	0	0
Longhurst	381	0	0
Wood & Co.	369	0	0
Chessum & Son	366	0	0

HORNSEY.—For making-up new roads for the Hornsey Local Board. Mr. T. de Courcy Meade, Engineer and Surveyor :—

	A	B	C	D	E	F
	£	£	£	£	£	£
Mowlem & Co., Westminster ...	3,340*	2,133*	297	3,583*	1,113	834*
Dunmore, T. G., Crouch End.....	3,700	2,241	298	3,799	950*	893
Aspinall & Son, Finsbury Park.	3,900	2,249	284*	3,815	1,180	969

A. Shepherd's-hill, 3rd section.
B. Wolseley-road, 2nd section.
C. Burgoyne-road, 2nd section.
D. Fernie Park-road, 3rd section.
E. Elder-avenue.
F. Weston-park, 2nd section.
* Accepted.

KINGSTON-ON-THAMES.—For pulling down and rebuilding business premises, 34, Thames-street, Kingston-on-Thames. Mr. R. Crawys, architect :—

Lane	£1,750	0	0
Turtle & Appleton	1,744	0	0
Ackerman	1,723	0	0
Oldridge	1,695	0	0
Wells	1,545	0	0
Rodwell (accepted)	1,532	0	0

LEE-ON-THE-SOLENT.—For the erection of "Waverley," Marine Parade, Lee-on-the-Solent, for Miss M. R. Jenkins. Mr. H. A. Alexander, architect, 72, Cannon-street, E.C. :—

Pusey & Lumley	£830	0	0
Blanch	833	10	0
H. W. Bull	799	0	0
Franklin	755	0	0
Ford & Kirrage	730	0	0
Wood & Co.	675	0	0
Henley & Co.	670	0	0

LONDON.—For alterations and additions to No. 13, James-street, Buckingham-gate, for Mr J. C. Bird. Messrs. J. T. Wimperis & Arber, architects. Quantities by Mr. Saml. Alen, 240, Lancaster-road, W. :—

Prestige & Co.	£945	0	0
Bush & Son	937	0	0
W. Johnson	900	0	0
J. T. Chappell	877	0	0
Patrick & Son	873	0	0
Colls & Sons	840	0	0
Putman & Fotheringham	815	0	0

LONDON.—For alterations and additions at No. 390, Edgware-road, for Messrs. Lilley & Skinner. Mr. Arthur Sykes, architect, 16, Brunswick-square, W.C. :—

Davey	£269	0	0
Pope	243	0	0
Sumner (accepted)	207	0	0

LONDON.—For alterations at the "Cock" tavern, Shaftesbury-avenue, for Mr. Robert Gosheron, jun. Mr. E. E. Niblett, architect, Hackney :—

Anley	£362	0	0
Veale	349	0	0
Spencer & Co.	320	0	0
J. Walker	295	0	0

LONDON.—For erecting All Saints' Church, West Dulwich. Mr. G. H. Fellowes Prynne, architect :—

Kirk & Randall	£22,143	0	0
Mark Martin	20,200	0	0
Abley	20,112	0	0
Perry & Co.	20,069	0	0
J. Martin	19,977	0	0
Kynoch & Co.	19,595	0	0
Dove Bros.	19,409	0	0
Ball & Son	18,985	0	0
Bowyer Bros.	18,930	0	0
Goddard & Son	18,909	0	0
Rowse	14,117	0	0

LONDON.—For alterations and repairs to "The Load of Hay," Praed-street, Paddington, W., for Mr. R. Baker. Messrs. Saville & Martin, architects, 86 and 87, Strand, W.C. Quantities supplied :—

Schlater	£1,870	0	0
Burdett & Sons	1,735	0	0
Ward & Lamble	1,497	0	0
Walker	1,450	0	0
Spencer & Co.	1,390	0	0
Oldrey & Co.	1,368	0	0
Gould & Brand	1,306	0	0
Yardley & Sons	1,169	0	0
Plumber's Work.			
Watts & Co.	127	17	0
Heath	117	0	0
Rase	114	17	0
Helling	112	0	0
Gas-fitter's Work.			
Vaughan & Brown	46	0	0
Winn	42	6	6
Pragnell	41	10	0

LONDON.—For alterations and additions to the Islington Dental Surgery, No. 69, Upper-street, Islington, N., for Mr. Chadwick Brown. Mr. G. H. Elphick, architect :—

L. H. & R. Roberts	£497	0	0
C. B. Roberts	409	0	0
A. & W. Garnar, Peckham	394	0	0

LONDON. — For desks and fittings for Capital and Counties Bank, Piccadilly Branch. Mr. W. Kinder, architect, 3, Old Broad-street, E.C. :—

Warland	£298	0	0
Drew & Cadman	250	0	0
Ratcliffe	243	9	0

MELLIS (Norfolk).—For the erection of new grist-mill, near the railway station. Mr. F. Whitmore, architect, Chelmsford :—

W. H. Gibbs, Saxmundham	£415	0	0
Alfred Coe, Ipswich	400	0	0
O. T. Gibbons, Ipswich	390	0	0
Alf. Diss, West Bergholt	350	0	0

NOWTON (Suffolk).—For the erection of new rectory-house at Nowton, near Bury St. Edmunds. Mr. F. Whitmore, architect, Chelmsford :—

H. G. Frost, Bury St. Edmunds	£1,429	0	0
J. Shillitoe & Son, Bury St. Edmunds	1,400	0	0
J. Robinson, jun., Bury St. Edmunds	1,343	0	0
G. R. Hawkins, Monks Eleigh	1,300	0	0
A. Diss, West Bergholt	1,300	0	0
F. Tooke, Bury St. Edmunds	1,120	0	0

PINNER (Middlesex).—For pulling down and re-building "The George," for Messrs. Salter & Co., of Rickmansworth. Mr. Charles P. Ayres, 52, High-street, Watford, architect :—

H. M. Dove	£995	0	
G. & J. Waterman	894	0	0
T. Turner, Limited (accepted)	846	0	0

[All of Watford.]

WATFORD.—For warehouse at Watford, for Messrs. R. White & Sons. Mr. C. W. Lovett, architect, 14, Cockspur-street, London, W. :—

Judge & Eames (accepted)	£1,550	0	0

WEYBRIDGE.—For erecting pair of houses for Mr. Geo. Kent. Mr. W. I. Chambers, architect, Woking :—

W. & A. Brown, Oatlands Park	£1,100	0	0
W. B Young, Weybridge	950	0	0
F. Peters, Oatlands Park	940	0	0
Thos King, Oatlands Park	930	0	0
Matthews & Mann, Weybridge *	910	0	0

* Accepted.

WOODFORD.—For building a villa residence at Woodford :—

A. Hood, Bethnal-green-road*	£472	0	0

* Accepted.

Premises at Wastow-hill, Upper Norwood.—In the list of tenders for this work, published on p. 156 of our last number, read "*J. & C. Bowyer*," £974, instead of the other name appended to that tender.

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W. W.—W. P. B.—"Box" (it is not our business to answer such questions).—"Cambridge" (no name or address of correspondent enclosed).—C. H.—"Mining" (see below the notice, which has stood there for many years, that we cannot undertake to look up books for readers).—H. I. N. (ineligible for insertion, amount not being stated).

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